COMMONWEALTH BUREAU OF
PARASITOLOGY (HELMINTHOLOGY).
WINCHES FARM.
326, HATFIELD ROAD
ST. ALBANS, HERTS.

VOLUME 2. Parts 9/10 *August*, 1951
pp. 241—304

THE BULLETIN OF ZOOLOGICAL NOMENCLATURE

28

The Official Organ of

THE INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

Edited by

FRANCIS HEMMING, C.M.G., C.B.E.

Secretary to the International Commission on Zoological Nomenclature

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LONDON :

Printed by Order of the International Commission on Zoological Nomenclature
and
Sold on behalf of the International Commission by the International Trust for Zoological Nomenclature
at the Publications Office of the Trust
41, Queen's Gate, London, S.W.7

1951

Price One Pound

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BULLETIN OF ZOOLOGICAL NOMENCLATURE

Volume 2, Parts 9/10 (pp. 241–304) 15th August, 1951

NOTICES PRESCRIBED BY THE INTERNATIONAL CONGRESS OF ZOOLOGY

The following notices are given in pursuance of decisions taken, on the recommendation of the International Commission on Zoological Nomenclature (see 1950, *Bull. zool. Nomencl.* **4**: 51–56, 57–59), by the Thirteenth International Congress of Zoology, Paris, July 1948 (see 1950, *Bull. zool. Nomencl.* **5**: 5–13, 131).

(a) Date of commencement by the International Commission on Zoological Nomenclature of voting on applications published in the " Bulletin of Zoological Nomenclature "

NOTICE is hereby given that normally the International Commission will start to vote upon applications published in the *Bulletin of Zoological Nomenclature* on the expiry of a period of six calendar months from the date of publication in the *Bulletin* of the applications in question. Any specialist who may desire to comment upon any of the applications published in the present Double Part (vol. 2, Parts 9/10) of the *Bulletin* is accordingly invited to do so in writing to the Secretary to the Commission, as quickly as possible and in any case, in sufficient time to enable the communication in question to reach the Secretariat of the Commission before the expiry of the six-month period referred to above.

Notices prescribed by the International Congress of Zoology (*continued*).

(b) Notice of the possible use by the International Commission on Zoological Nomenclature of its plenary powers in certain cases

NOTICE is hereby given that the possible use of the plenary powers is involved in applications published in the present Double Part of the *Bulletin of Zoological Nomenclature* (Vol. 2, Parts 9/10) in relation to the following names :—

(1) *Entamoeba* Casagrandi & Barbagallo, 1895, *Endamoeba* Leidy, 1879, and *Poneramoeba* Lühe, 1909 (Class Rhizopoda) (action designed to validate existing practice) (Z.N.(S.) 185).

(2) *dentatus* Diesing, 1839 (as published in the binominal combination *Stephanurus dentatus*) (question whether this name should be preserved for the kidney worm of swine) (Z.N.(S.) 188).

(3) *Eysarcoris* Hahn, 1834 (Class Insecta, Order Hemiptera) (proposed validation of existing nomenclatorial practice) (Z.N.(S.) 212).

(4) *acuminata* Ioff & Tiflov, 1946 (as published in the combination *Rhadinopsylla* (*Rectofrontia*) *acuminata*) as applied to species No. 68 (proposed elimination of homonymy caused by a printer's error) (Z.N.(S.) 386).

FRANCIS HEMMING,

Secretary to the International Commission on Zoological Nomenclature.

Secretariat of the
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Zoological Nomenclature,
28, Park Village East, Regent's Park,
LONDON, N.W.1, England.

28*th July*, 1951.

"ENTAMOEBA COLI" VERSUS "ENDAMOEBA COLI"

By HAROLD KIRBY
(*Department of Zoology, University of California, Berkeley, California, U.S.A.*)

(Commission's reference Z.N.(S.)185)

(Application submitted to the International Commission on Zoological Nomenclature on 17th January, 1945: first published in June, 1945, in *The Journal of Parasitology* **31** (3): 177-184).

In drawing up the argument for *Opinion* 99 of the International Commission on Zoological Nomenclature, Stiles showed a wish to reject the name *Entamoeba* in the interest of clear distinction. He wrote: "It seems obvious that unless the name *Entamoeba* is definitely suppressed both the nomenclatorial and the taxonomic status of the species which come into consideration will become even more confused." The result of his reasoning was rejection of the name, but the benefits that he hoped for have not been realised. There have been some who in following the *Opinion* have been influenced to take a position regarding the taxonomic status of the amoebae that is not in accord with clear distinction, because unless they took that position the necessary large nomenclatorial departure from the usage that is very widespread in the literature of medical zoology would indeed result in confusion. Retention of the two names *Endamoeba* and *Entamoeba* would permit a clear-cut taxonomic differentiation to be made at the same time that a minimum of departure from customary usage is necessitated. Therefore it seems to me that *Opinion* 99 has actually increased the difficulty that Stiles wished to avoid. I agree with Dobell (1938) that the *Opinion* in its present form should not be regarded as decisive.

The equivocal interpretation that some authors have made of *Opinion* 99 is illustrated by Craig's criticism (1944) of Kudo's retention of the name *Entamoeba*: "It would have been much better had he followed the ruling of the International Committee of Zoological Nomenclature and used the spelling recommended by it as preferable, i.e., 'Endamoeba.'" Kudo took the position that the species *coli* should not be put into the same genus as the species *blattae*, and his failure to follow *Opinion* 99 made it possible for him to choose *Entamoeba* as the generic name for *coli*. It is not a question of alternative spelling of the name of the genus: the *Opinion* does not constitute an approval of the spelling *Endamoeba* as against *Entamoeba*. There is no choice of orthography: *Endamoeba* is correct and has priority as the name of the genus typified by *E. blattae*; all amoebae in that genus are called *Endamoeba*, and those not in that genus cannot be called *Endamoeba*.

The *Opinion* was published in 1928, and so far as I know, between that time and this only two names have been used in connection with the species *coli*, *histolytica* and *gingivalis*: *Endamoeba* by those who put the three amoebae into the same genus as *blattae*, and *Entamoeba* by those who do not. The authors in the former group do not accept the generic distinction; whether or not

they follow *Opinion* 99 does not properly enter into their adoption of *Endamoeba*. The authors in the latter group do recognise the generic distinction, and do not follow the *Opinion*. If there should be a third group of authors, who recognise generic distinction among these endozoic amoebae, and accept *Opinion* 99, it would be necessary for them to write *Poneramoeba histolytica*, *Poneramoeba coli*, and *Poneramoeba gingivalis*.

The following chronological summary of the history of this matter sets forth the important facts that need to be considered :—

1879. Leidy (1879a, p. 300) introduced the generic name *Endamoeba*, with the one species *Endamoeba blattae*, named *Amoeba blattae* by Bütschli in 1878. The same proposal was printed on 2nd December in Leidy, 1879b, p. 205.

1895. Casagrandi and Barbagallo introduced the generic name *Entamoeba*, giving as the included species *Amoeba coli* (Lösch) and *Amoeba blattarum* (Bütschli). They were ignorant of Leidy's name.

1897. Casagrandi and Barbagallo (p. 163) again printed the name *Entamoeba*, giving as the included species *Entamoeba hominis* and *Entamoeba blattarum*.

1903. Schaudinn, using the generic name *Entamoeba* C. & B., divided *Amoeba coli* of Lösch into two species, *Entamoeba coli* Lösch and *Entamoeba histolytica* n. sp. He did not mention the species *blattae*, and probably was ignorant of Leidy's name.

1910. Chatton assigned various endozoic amoeba to the genus " *Entamoeba* Leidy (1879)." Among the included species were : *Entamoeba* coli (Lösch) 1875, emend. Schaudinn (1903) ; *E. blattae* (Bütschli) 1878 ; *E. ranarum* (Grassi) 1881 ; *E. histolytica* Schaudinn 1903. Chatton stated that the paternity of *Entamoeba* had been wrongly attributed by authors to Casagrandi and Barbagallo. He made no reference to the fact that Leidy's name was actually *Endamoeba*.

1912. Séance du 14 février, mémoire paru le 5 mars (acc. to Chatton, 1912). Chatton and Lalung-Bonnaire wrote (p. 142) : " La dénomination non latine d'Entamibes, appliquée aux amibes normalement parasites du tube digestif est d'un usage commode qui la fera conserver. Mais traduite en nom générique latin, elle ne peut plus s'appliquer actuellement aux amibes du tube disgestif des Vertébrés. Ce n'est pas, en effet, à ces dernières qu'elle a été appliquée en premier lieu. C'est Leidy qui à créé le genre *Entamoeba* pour l'amibe de la Blatte, et ce n'est qu'en 1897 que Casagrandi et Barbagallo l'ont appliquée aux amibes intestinales des Vertébrés." The authors considered that the amoebae of vertebrates must be put in a separate genus, for which they proposed the name *Löschia*, to contain *coli* Lösch and other species.

1912. Séance du 26 mars. Chatton reported again the generic differentiation

of endozoic amoebae made in the above paper. He definitely designated *Löschia coli* Lösch, cysts 8 nuclei or more, as type of the genus *Löschia*. Remarking that protistologists had wrongly attributed the paternity of the genus *Entamoeba* to Casagrandi and Barbagallo 1897, he wrote (p. 111): "Ces derniers avaient bien appliqué le nom d'*Entamoeba* à une Entamibe humaine, mais Leidy l'avait donné des 1879 à *l'Amoeba blattae* de Bütschli." In a footnote to this statement he noted that Leidy's spelling was "*Endamoeba*," but dismissed that name as an orthographic variant.

1913. Brumpt wrote of the amoebae of man under the name "*Entamoeba* Leidy, 1879," making the same mistake for *Endamoeba* that Chatton as well as Alexeieff (1912) had previously made. In a footnote (p. 21) he wrote: "Ce même genre a été créé de nouveau en 1897 par Casagrandi et Barbagallo pour leur *E. hominis*, synonyme de *E. coli*." That sentence has been accepted by Stiles and Boeck (1923, p. 122), Stiles and Hassall (1925, p. 8), and Stiles (1928 in *Opinion* 99) as a designation of the type *E. coli* (as *E. hominis*) for *Entamoeba* Casagrandi & Barbagallo. (In the third edition, 1922, Brumpt made the same error of "*Entamoeba* Leidy"; but in the next one, 1927, he used *Entamoeba* C. & B. and noted that *Endamoeba* Leidy should be reserved, in agreement with Wenyon, 1926, for the amoeba of the roach.)

1919. Dobell used *Endamoeba* Leidy, 1879, for *E. blattae* only, and *Entamoeba* Casagrandi & Barbagallo, 1895, for *E. coli*, *E. histolytica*, and *E. gingivalis*.

1923. Stiles and Boeck, in a study of the nomenclatorial status of the protozoa of man (p. 125), considered the genus *Endamoeba* Leidy, 1879, with two sub-genera: *Endamoeba* Leidy, 1879 (type by monotypy *E. blattae*) and *Poneramoeba* Lühe, 1909 (type by monotypy and original designation *E. histolytica*). They stated (p. 124) that "*Entamoeba* 1895 is not available because of *Endamoeba* 1879"; evidently that is because they thought of *Entamoeba* as a homonym, or orthographic variant, because here they dealt with a separate taxonomic category (the sub-genus) from *Endamoeba*. The type of *Entamoeba* 1895 is given (p. 122, 124) as *E. hominis* tsd.=*coli* and *coli* (s. *hominis*); type by subsequent designation is by Brumpt, 1913.

1925. Stiles and Hassall, in the "Key-Catalogue of the Protozoa Reported for Man," list (p. 8) *Entamoeba* C. & B., 1895, type by subsequent designation *hominis*=*coli*, as a subjective synonym of *Endamoeba* Leidy, 1879. It appears from the definition of subjective synonym by Stiles and Boeck, 1923, that it is a category providing for cases where the identity in question is not absolute, but depends on "the experience and judgment of the reviser" (p. 138.) Since in the key-catalogue the types of *Entamoeba* and *Endamoeba* are given as different, although those two types are treated as members of the same genus, it is likely that the reference is to the difference of opinion about generic assignment. Otherwise *Entamoeba* would simply have been designated as a homonym; that category is dealt with in the same paper. Reference to *Entamoeba* as a synonym is, therefore, evidently on the basis that its type, *Ent. coli*, belongs in the same genus as *End. blattae*, according to Stiles and Hassall.

1928. The International Commission on Zoological Nomenclature published *Opinion* 99 in response to an inquiry as to whether the names *Endamoeba* and *Entamoeba* should be considered homonyms. The summary of the *Opinion* reads : " *Entamoeba* 1895, with *blattae* as type by subsequent (1912) designation, is absolute synonym of *Endamoeba* Leidy, 1879a, p. 300, type *blattae*, and invalidates *Entamoeba* 1895, type by subsequent (1913) designation *hominis*= *coli*." The report also contained the decision that *Entamoeba* is a homonym of (" philologically the same as ") *Endamoeba*. It is presumably on that basis that the Secretary recommended that " the name *Entamoeba* 1895, either with type *hominis*=*coli* as definitely designated by Brumpt, 1913, p. 21, or with *blattae* as accepted by Chatton and Lalung (1912, 111) and as implied by Chatton (1910, 282), be definitely invalidated by *Endamoeba* Leidy, 1879a, p. 300, type *blattae*, irrespective of the point whether the type of *Entamoeba* be considered *blattae* or *coli*." (The reference to Chatton and Lalung, 1912, p. 111, is evidently a mistake for Chatton and Lalung-Bonnaire, 1912, p. 142, or for Chatton, 1912, p. 111.)

It is evident from this summary that Stiles (1928) was justified in his statement that " the case has already produced considerable confusion in literature." It is also evident, however, that this confusion need not have existed if authors had simply been attentive to the correct forms. Then *Endamoeba* Leidy would have been used for any generic concept including the species *blattae ;* and *Entamoeba* C. & B. would either have been rejected, or used solely for any generic concept omitting *blattae* and including *coli*. The errors made by earlier authors should not influence us in an effort to reach a solution of the problem.

The answer to the taxonomic problem is subject to differences of opinion. Many authors follow the usage of Stiles and Boeck, 1923, in writing *Endamoeba, coli ;* that usage has been almost universal in American compilations in medical zoology since it was adopted in 1926 by Craig (who in 1911 used *Entamoeba* Casagrandi and Barbagallo without reference to the genus *Endamoeba* Leidy). American writers who recognise generic distinction between *blattae* and *coli* include Kudo (1939, 1944), Wenrich (*Entamoeba* used for *histolytica* and *coli* in 1940, 1944, and other papers of similar date), Cleveland (Cleveland and Sanders, 1930, and other papers), Pearse (1942), and Meglitsch (1940, in connection with a profound study of *blattae*). And there are many in various parts of the world who follow the same course ; (for example, Wenyon, 1926 ; Dobell, 1919, 1938 ; Brumpt, 1936 ; Reichenow, 1928), so that it is not a question of individual or even minority disagreement in the question of taxonomic differentiation.

It is not my purpose in this paper to attempt to defend one position in taxonomy or attack the other. Because of the very large difference between the species *blattae* and *coli* in the nuclear structure of the trophic forms, I think that the burden of proof should rest on those who assert that the two amoebae belong in the same genus—especially when the same authors recognise as valid certain other genera of endozoic amoebae. A comprehensive analysis of the taxonomy of all amoebae, free living and endozoic, is much to be desired.

Morris (1936) examined the problem so far as certain endozoic amoebae are concerned; but the result of his study is not conclusive, for it omitted from consideration certain other endozoic amoebae that would also have to have the status of sub-genera of *Endamoeba*, according to his treatment. The purpose of the present paper is nomenclatorial: it is an attempt to show that the word *Entamoeba* should remain available for a genus of which *Ent. coli* is the type.

Opinion 99 declares that those of us who think that the species *coli* and similar forms do not belong in the same genus as *blattae* cannot use the name *Entamoeba* for that different genus. There are two grounds upon which that declaration is based. One of them is that *Entamoeba* is a homonym of *Endamoeba*—that the two words are not sufficiently different from one another in orthography to be usable as separate words. The other is that *Entamoeba* has the same type species as *Endamoeba*, and therefore falls as a synonym. The latter decision is the only one given in the summary of *Opinion* 99; it is not necessary that it should be rendered after the generic name has been dismissed as a homonym, so evidently it is intended to provide a reserve in case of doubt.

That doubt certainly exists (Dobell, 1938). Obviously we are not here concerned with whether the words have the same meaning or not, but with whether one word is the same word as the other. There is a difference between inadvertent interchange of two names that have a status in zoological nomenclature, and the use synonymously of such words as endoplasm and entoplasm or endoderm and entoderm. There is nothing in the articles of the International Rules of Zoological Nomenclature that justifies the conclusion that *Entamoeba* must be rejected as a homonym. Certainly Chatton's statement, although cited as authoritative by Stiles, does not constitute justification; it is merely an assertion in a one-line footnote, unsupported by reference to the Rules or anything else. It is only in the argument for *Opinion* 99 that evidence is given, but that evidence can as well be read in support of the retention of the two names as different. Jordan's report in the *Opinion* states that they come in the category of names of which the spelling in Latin varied to a slight extent and which the Rules of Nomenclature do not accept as different. His reference is to Article 35, in which precise differences are given by which specific names of the same origin and meaning are insufficiently distinguished. There seems to be no indication that Article 35 is intended to establish a general category allowing interpretation of other differences than those specified; and in that Article there is nothing whatever about the sort of difference that exists between the words *Endamoeba* and *Entamoeba*. Furthermore, there is evidence in *Opinion* 99 itself that the two words are not necessarily of the same origin, and that would exclude them from consideration under the rules given in Article 35.

Article 35 deals only with specific names, and it might seem possible that a different interpretation for generic names would be allowed. Now, however, a precise statement concerning differences in generic names has been given (*Opinion* 147, 1943). A generic name of the same origin and meaning as a

previously published generic name is to be rejected as a homonym of the said name if it is distinguished therefrom only by certain specified differences which are the same as the ones given for specific names in Article 35. *Opinion* 99 was not mentioned by the Commission in the rendering of *Opinion* 147, although it dealt with the subject that was being considered.

It is not possible to find any definite reason in the Code, or any valid evidence in *Opinion* 99, for rejection of *Entamoeba* as a homonym ; but the recommendation in Article 36 can, as Taliaferro remarked, be evoked in support of retention of both names. These facts have already been discussed by Dobell (1938).

In *Opinion* 99 the consideration that is apparently regarded as the more important one, since it alone is given in the summary, is that of synonymy—that *Entamoeba* C. & B. is an absolute synonym (or objective synonym, Stiles and Boeck, 1923, p. 135) of *Endamoeba* Leidy, because the names follow their types, and the same species, *E. blattae*, is the type of each. When Stiles presented the case so as to arrive at this conclusion, he changed his approach to the matter. In 1923 he evidently regarded *Entamoeba* as a homonym, in 1925 he designated it as a subjective synonym on the basis of the taxonomic assignment of its species, but in both papers he accepted *E. hominis=coli* as type of *Entamoeba* C. & B. by subsequent designation by Brumpt, 1913. In *Opinion* 99, after stating that Brumpt's action was the first type designation in words, Stiles found it possible to interpret Chatton, 1912, as having designated *blattae* as type of *Entamoeba* C. & B. Stiles did not make clear the reason for this interpretation, except in that he cited *Opinion* 6 in support of it.

Entamoeba C. & B., 1895, is analogous to the hypothetical Genus *A* Linnaeus, 1758, in *Opinion* 6, in that when proposed it contained two species, which we now know as *coli* and *blattae*. Casagrandi and Barbagallo did not indicate which was the type. *Opinion* 6 declares that when an author has removed one of the two species to another monotypic genus, leaving only one species in the first genus, he is to be construed as having fixed the type of the first genus. Jordan's report in *Opinion* 99 follows the parallel exactly, crediting Chatton with having removed *coli* from *Entamoeba* C. & B. to the genus *Löschia*, thereby leaving *blattae* as the type of *Entamoeba*. If that is so, there is probably no doubt about the validity of the conclusion ; but I think it is not true that that Chatton really dealt with *Entamoeba* C. & B. in making the supposed division.

In every place in the three papers that Chatton wrote *Entamoeba* Leidy he was simply making a mistake for *Endamoeba* Leidy. Other authors before him who included *blattae*, with or without other amoebae, in *Entamoeba* C. & B. were also making a simple error ; they should have used *Endamoeba* Leidy. The acts of Chatton and Lalung-Bonnaire were on *Endamoeba* Leidy, given by mistake as *Entamoeba* Leidy, but not corresponding to *Entamoeba* C. & B. Chatton (1910) grouped various amoebae in this " *Entamoeba* Leidy." Chatton and Lalung-Bonnaire (1912) did not agree with that grouping, and removed *coli* and other species from it, leaving only *blattae*. That made no change in

the situation, except to restore it as it was originally. The revision was of the group concept authors had held of "*Entamoeba* Leidy"=*Endamoeba* Leidy, not of that genus itself, which was already attached to its type species.

The synonym argument in *Opinion* 99 depends upon crediting Chatton and Lalung-Bonnaire or Chatton with having comprehended *Entamoeba* C. & B. in what they did with "*Entamoeba* Leidy"=*Endamoeba* Leidy. Stiles' paragraph "d" in the argument, puts it: "Chatton's paper (1912, *Bull. Zool. France*, p. 113) is to be interpreted as designating *blattae* as type of "*Entamoeba*" 1897(=1895) [emendation of *Endamoeba*, but obviously construed as identical with *Entamoeba*]." (Chatton and Lalung-Bonnaire had priority in this matter, and the page reference is wrong.) But Chatton's "emendation of" (rather, error for) *Endamoeba* was "*Entamoeba* Leidy," not "*Entamoeba* 1897 (=1895)"; *Entamoeba* C. & B., 1895, was not an emendation, but a separately proposed word. Stiles' word "obviously" could have reference only to Chatton's opinion (1912) that the two words are orthographic variants, and therefore identical. Thus we return to the question of whether or not it is to be admitted that *Entamoeba* is a homonym of *Endamoeba;* and in consequence it appears to me that the whole argument of *Opinion* 99 stands or falls with the decision about the homonym question, in spite of the fact that the summary neglects that decision.

The summary of *Opinion* 99 presents the nomenclatorial treatment accorded *Entamoeba* C. & B. by Brumpt in 1913 as opposed to and invalidated by the prior treatment of that genus in the 1912 paper. On the contrary, however, it seems that Chatton and Brumpt had then exactly the same understanding of Casagrandi and Barbagallo's genus. In the historical account given above in 1897 Casagrandi and Barbagallo applied the name *Entamoeba* to intestinal amoebae of vertebrates, and the statement by Chatton (1912, p. 111) that those authors applied the name to a human amoeba. Those are the only references in the 1912 papers to the correct and original use of *Entamoeba*. Brumpt, who in 1913 wrote "*Entamoeba* Leidy," had adopted the nomenclature of amoebae used by Chatton in 1910. In the footnote that was accepted by Stiles as constituting the type designation he simply gave a different wording of what the 1912 authors had pointed out regarding the amoeba for which the genus *Entamoeba* C. & B. had been proposed; but in that wording, and in printing the name "*E. hominis* synonyme de *E. coli*" he was more specific. Brumpt has more recently used both *Endamoeba* and *Entamoeba;* and it is likely that the 1912 authors would have used Casagrandi and Barbagallo's name for the species *coli* and other amoebae of vertebrates instead of *Löschia* except for the fact that they considered *Endamoeba* and *Entamoeba* to be orthographic variants. Despite the fact that Chatton and Brumpt evidently had the same understanding of *Entamoeba* C. & B., Stiles found it possible to give the interpretation that Chatton had designated *blattae* as its type before Brumpt designated *coli* as its type. Yet the only difference in the treatment the two authors gave the genus is that the former did not print the species name, whereas the latter did so. Brumpt, therefore, was not considered to have comprehended *Entamoeba* C. & B. in "*Entamoeba* Leidy," as regards type designation, whereas Chatton was considered to have done so. The interpretation given in this part of the argument in *Opinion* 99 is obviously greatly strained.

CONCLUSION

Opinion 99 of the International Commission on Zoological Nomenclature does not constitute proof that *Entamoeba* Casagrandi and Barbagallo, 1895, cannot be used as a generic name. Its argument rests on two points : that *Entamoeba* is a homonym of *Endamoeba ;* and that *blattae* is the type species of both, so that *Entamoeba* falls also as a synonym of *Endamoeba* Leidy, 1879. The latter point, which is the only one brought out in the summary of *Opinion* 99, is not acceptable : it rests on the interpretation that *Entamoeba* is a homonym of the earlier name. The *Opinion* asserts, but does not demonstrate, that it is a homonym ; and there is nothing elsewhere in the Rules or *Opinions* that warrants the assertion. It is appropriate to place the species *coli* and *blattae* in separate genera ; and it is considered that *Entamoeba* Casagrandi and Barbagallo, 1895, is available as a generic name for *coli* and congeneric species at the same time that *Endamoeba* Leidy, 1879, is used for *blattae* and congeneric species.

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ON THE PROBLEMS EMBRACED IN "OPINION" 99 (RELATING TO THE NAMES "ENDAMOEBA" LEIDY, 1879, AND "ENTAMOEBA" CASAGRANDI & BARBAGALLO, 1895) RENDERED BY THE INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

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(Commission's reference Z.N.(S.)185)

I. Introduction.

Recently Professor Harold Kirby (1945) has written an able critique of the decisions embodied in *Opinion* 99 rendered by the International Commission on Zoological Nomenclature (1928). He has concluded that, contrary to certain of these decisions (1) *Entamoeba* Casagrandi and Barbagallo, 1895, cannot be regarded as a homonym of *Endamoeba* Leidy, 1879; and (2) the species with the trivial name *blattae* of Bütschli (1878) should not, despite the conclusions embodied in *Opinion* 99, be regarded as the type species of both genera, but only of *Endamoeba* Leidy, 1879.

2. I endorse Kirby's thesis wholeheartedly, but I should like to restate the problem in order to emphasize what I consider to be certain fallacies in *Opinion* 99, which are not altogether covered by Kirby, and to make certain further proposals. *Opinion* 99 is a remarkable collection of contradictions and apparent misinterpretations of the *Règles* and certain preceding *Opinions*, as I am prepared to show here.

3. Originally a draft of the present paper was submitted to Mr. Francis Hemming, Secretary of the International Commission, in 1946. Subsequently the author visited Mr. Hemming in August, 1948, and it was agreed between them that, in view of the extensive changes that the Thirteenth International Congress of Zoology, acting on the advice of the International Commission, brought about in the *Règles Internationales de la Nomenclature Zoologique* at the Paris Meetings of July, 1948, the paper should be examined in the light of any pertinent new decisions, revised, and submitted again. I have delayed doing this in anticipation of the publication of the "Official Records of Proceedings of the International Commission on Zoological Nomenclature at their Session, held in Paris in July, 1948." Now that this has been done in Volume 4 of *The Bulletin of Zoological Nomenclature*, I have been able to redraft the present paper and am resubmitting it herewith.

4. One of the decisions taken by the International Commission at Paris was that *Opinion* 99 was to be considered *sub judice* and that specialists were to be invited "to communicate to the Commission their views on the action to be taken by way of confirming, modifying or reversing the decisions recorded in [the *Opinion*]" (see 1950, *Bull. zool. Nomencl.* **4**: 337–338). This was done

on the basis of the recognition by the Secretary to the International Commission that *Opinion* 99 was " very poor " and should be reconsidered (see 1950, *Bull. zool. Nomencl.* **3** : 128). It is, therefore, particularly appropriate that the present paper be tendered for publication.

5. Moreover, it will be evident from the ensuing sections of this paper that it is of vital importance to the stability of the names of certain genera and species of amoebae parasitic in Man and other animals, that the International Commission not only revise *Opinion* 99, but consider such additional problems not originally raised therein as must be solved in order to give permanancy to the names of these parasites. This will require the exercise of the plenary powers to secure certain names and the placing of these and other names in the " Official List of Generic Names in Zoology," and the " Official List of Specific Trivial Names in Zoology," as provided for at Paris (see 1950, *Bull. zool. Nomencl.* **4** : 267–271, 333–335).

6. To aid both in the revision of *Opinion* 99 and in the realization of stability for the names applied to important enteric amoebae, the present paper is organized into several sections : (I) the present introduction ; (II) the historical background of *Opinion* 99 ; (III) and (IV) analyses of the summary and body, respectively, of *Opinion* 99 ; (V) the status of the trivial names *coli* of Grassi (1879) and *histolytica* of Schaudinn (1903) as applied to certain amoebae of Man ; and (VI) the status of the generic names *Endamoeba* Leidy, 1879, *Entamoeba* Casagrandi and Barbagallo, 1895, and certain others applied to enteric amoebae. Finally, in section (VII) are summarized the conclusions drawn from the studies of the preceding sections.

II. Historical Background of " Opinion " 99.

7. *Opinion* 99 is entitled " *Endamoeba* Leidy, 1879, vs. *Entamoeba* Casagrandi and Barbagallo, 1895." Its summary reads as follows : " *Entamoeba* 1895, with *blattae* as type by subsequent (1912) designation, is absolute synonym of *Endamoeba* Leidy, 1879a, p. 300, type *blattae*, and invalidates *Entamoeba* 1895, type by subsequent (1913) designation *hominis*=*coli*."

8. To recapitulate briefly, the following are the principal historical facts* of the case treated by *Opinion* 99, many of which were not, however, considered in the *Opinion* :

(i) Lösch (1875) described in detail the clinical picture and lesions resulting from an amoebic infection in the large bowel of a young Russian and also provided a description (pp. 203–207) and figures (Pl. x, figs. 1–3), of the causative organism from which it is quite evident that he was dealing with the species now generally called *Entamoeba*, or *Endamoeba*, *histolytica*. To this form he gave the

* For a more detailed history the excellent monograph by Dobell (1919) should be consulted—also the less lucid, although more exhaustive, survey of Stiles and Boeck (1923).

name *Amoeba coli* (: 208).

(ii) Bütschli (1878 : 273–277) described a new species, *Amoeba blattae*, from the gut of the oriental roach, *Blatta orientalis* Linnaeus, 1758—an insect still known by that name.

(iii) Grassi (1879) described amoebae from human faeces and identified them (p. 445) as representing the same species as observed by Lösch (1875). However, in the opinion of Dobell (1919) Grassi dealt primarily with the species now generally known as *Entamoeba*, or *Endamoeba*, *coli*, although some individuals, at least, of *E. histolytica* were apparently also seen.

(iv) Leidy (1879 : 300) formed the new genus *Endamoeba* for the single species, hence type species (by monotypy : Article 30(c) of the current *Règles*†) *Amoeba blattae* Bütschli, 1878.

(v) Casagrandi and Barbagallo (1895 : 18) in a study of an intestinal amoeba of Man, which they called "*Amoeba coli* Lösch," erected a new genus *Entamoeba* in apparent ignorance of the existence of the name of *Endamoeba*** Leidy, 1879. In it they placed "*Amoeba coli* (Lösch)" and "*Amoeba blattarum* (Bütschli)" ["*Amoeba blattae* Bütschli, 1878]. No type species was designated. It is evident from their paper that these authors were dealing not with Lösch's *Amoeba coli*, but with Grassi's—the species today known generally as *E. coli*. They did not themselves form the combination *Entamoeba coli*, although it is credited to them by Dobell (1919) ; actually this was later done by Schaudinn (1903). In a subsequent paper they (Casagrandi and Barbagallo, 1897 : 103) renamed this species *Entamoeba hominis*.

(vi) Schaudinn (1903) was responsible for fixing the usage of the trivial names now almost universally employed for the two species of amoebae in humans, originally designated *Amoeba coli* by Lösch (1875) and *Amoeba coli* by Grassi (1879)—what may aptly be termed the dysenteric and large nondysenteric amoebae of Man, respectively. As Dobell (1919) has pointed out, by far the happiest solution would have been for Schaudinn to accept Lösch's name for the dysenteric species, as would have been correct, and, in view

† The most recent presumably official edition of the *Règles* appeared in 1929 in the publication of the X [1927] International Congress of Zoology at Budapest (Int. Comm. Zool. Nomencl. 1929). A new official edition is now in preparation based on extensive changes adopted by the XIII International Congress of Zoology at its Paris Meeting in 1948, acting on the advice of the International Commission on Zoological Nomenclature.

** In base a tutti questi dati, anzi, riteniamo necessario tornare sulla classifica delle *Amebe*, stabilendone un nuovo genere, che proponiamo di chiamare *Entamoeba* e vi collochiamo subito l'*Amoeba coli* (Lösch), e l'*Amoeba blattarum* (Bütschli).

of the fact that Grassi's name was a homonym of Lösch's, to take the next available name, *Entamoeba hominis* Casagrandi and Barbagallo, 1897, for the nondysenteric species. His observations on morphology as well as nomenclature were on several counts erroneous and have been severely and justifiably criticized by Dobell. His nomenclatorial conclusions were that the nondysenteric species should be called "*Entamoeba coli* Lösch emend. Schaudinn" (:564) and that the dysenteric species should be given a new name, for which he proposed "*Entamoeba histolytica*" (:564, 570). In so doing, he accepted the genus *Entamoeba* Casagrandi and Barbagallo, 1895, for both species. Schaudinn's prestige was such that his determinations became entrenched in the literature, and to-day the trivial names, at least, dominate all fields concerned with amoebae in Man.

(vii) Lühe (1909 : 421) erected the new genus *Poneramöeba* for the single species, *Entamoeba histolytica* Schaudinn, 1903, from Man ; this he specifically designated as the type species of his new genus. It was the next new genus after *Entamoeba* Casagrandi and Barbagallo, 1895, erected or used for amoebae in the vertebrate digestive tract.

(viii) Chatton (1910 : 282–284) placed in a genus "*Entamoeba* Leidy (1879)" seven supposed species. "*Entamoeba coli* (Lösch) 1875" [=*Amoeba coli* Grassi, 1879], "*E. blattae* (Bütschli) 1878" ; "*E. ranarum* (Grassi) 1881" "*E. muris* (Grassi) 1881" ; *E. buccalis* Prowazek, 1904 ; *E. histolytica* Schaudin, 1903 ; and "*E. tetragena* Viereck 1906=*E. africana* Hartmann 1908" [=*E. histolytica*]. The only mention of Casagrandi and Barbagallo's work appearing in Chatton's paper was in a footnote to the effect that "*Entamoeba*" had been incorrectly assigned by Doflein (1909) to the authorship of the Italian workers.* Chatton did not cite any species as the type species of his "*Entamoeba*," nor did he mention the spelling "*Endamoeba*" used by Leidy.

(ix) Chatton and Lalung-Bonnaire (1912 : 142) removed the amoebae of the digestive tract of vertebrates from the genus "*Entamoeba* Leidy" into a new genus *Löschia*, stating that only the species originally called *Amoeba blattae* by Bütschli (1878) should remain in Leidy's genus. To *Löschia* they transferred the following four species from *Entamoeba* : "*E. coli* Lösch" [=Grassi], "*E. tetragena* Viereck" [=*histolytica* Schaudinn], "*E. ranarum* Grassi," and "*E. muris* Grassi," and for the forms with a *tetragena*-[=*histolytica*-] like nuclear picture they raised a new subgenus *Viereckia*) "*E. coli* Lösch" was designated as the type species of the nomino-

* C'est à tort que Doflein (1910 [=1909]) attribue la paternité du genre *Entamoeba* à Casagrandi et Barbagallo (1897 [*sic*]).

typical subgenus, hence of the genus, *Löschia*.* They incorrectly claimed that Casagrandi and Barbagallo (1897) had applied Leidy's genus to the amoebae of the vertebrate digestive tract.†

(x) Chatton (1912 : 111) republished the conclusions already expressed in his paper with Lalung-Bonnaire, but mentioned only "*Löschia coli*" and "*Viereckia tetragena*" in the genus *Löschia*. For the first time he mentioned—in a footnote—the spelling *Endamoeba*,** but dismissed it as an orthographic variant.

(xi) Brumpt (1913 : 25) referred the amoebae of Man to the genus "*Entamoeba* Leidy, 1879." He also stated—in a footnote—that the same genus had been created in "1897" by Casagrandi and Barbagallo for†† "*E. coli*."

(xii) Crawley (1913 : 185) listed "*Entamoeba histolytica* Schaudinn, 1903" as the type species of the genus *Entamoeba*.

(xiii) Dobell (1919 : 17–19) in a scholarly review of the nomenclature of the amoebae in Man accepted as valid for amoebae of the vertebrate digestive tract the genus *Entamoeba* Casagrandi and Barbagallo, 1895 (*non Endamoeba* Leidy, 1879), formally (: 18) selected as its type species "*E. coli*," and included as congeneric with *E. coli* the species *E. histolytica*, among others. He confined the genus *Endamoeba* Leidy, 1879, to *Amoeba blattae* Bütschli, 1878. In later parts of his paper he reviewed in detail the nomenclatorial history of the species to-day generally known by the trivial names *coli* and *histolytica*.

(xiv) Stiles and Boeck (1923 : 121–150) exhaustively discussed the nomenclature of the dysenteric and nondysenteric amoebae of Man and dismissed (: 124) *Entamoeba* Casagrandi and Barbagallo, 1895, as a homonym‡ of *Endamoeba* Leidy, 1879. Nevertheless they regarded Brumpt (1913) as having fixed the type species of the former as *Entamoeba hominis* [=*Amoeba coli* Grassi, 1879], and they also recognized a separate nominal genus *Entamoeba* Chatton,

* On pourra même distinguer subgénériquement les Entamibes à 4 noyaux (type *tetragena*), des Entamibes à 8 noyaux (type *coli*), sous le nom de *Viereckia n. subgen.*

† C'est Leidy qui a créé le genre *Entamoeba* pour l'amibe de la Blatte, et ce n'est qu'en 1897 que Casagrandi et Barbagallo l'ont appliquée aux amibes intestinales des Vertebrés.

** Avec la variante orthographique *Endamoeba* qui ne peut en aucune façon constituer un prétexte à conserver les deux noms simultanément.

†† Ce même genre a été créé de nouveau en 1897 par Casagrandi et Barbagallo pour leur *E. hominis*, synonyme de *E. coli*.

‡ [*Entamoeba* 1895 is not available because of *Endamoeba* 1879.]

1912 (overlooking Chatton's 1910 paper and not recognizing the priority of Chatton and Lalung-Bonnaire's paper) as an emendation of *Endamoeba* Leidy, 1879, consequently with the same type species, *Amoeba blattae* Bütschli, 1878. They provisionally regarded *Amoeba blattae* Bütschli, 1878 (type species of *Endamoeba* Leidy, 1879—by monotypy), and *Entamoeba hominis* Casagrandi and Barbagallo, 1897 [=*Amoeba coli* Grassi, 1879] as congeneric. The foregoing conclusions were essentially followed by Stiles and Hassall (1925), except that they listed *Entamoeba* Casagrandi and Barbagallo, 1895, as a synonym rather than a homonym of *Endamoeba* Leidy, 1879.

(xv) The International Commission on Zoological Nomenclature in *Opinion* 95 (1926) placed *Endamoeba* Leidy, 1879, with type species *Amoeba blattae* Bütschli, 1879 (by monotypy) on the "Official List of Generic Names in Zoology." Later the International Commission (1928) reviewed some of the facts given here under paragraphs (i) to (xiv), and published *Opinion* 99. After much indecisive discussion it was finally concluded in the summary of the latter *Opinion*, that Chatton (1912) had selected a type species for "*Entamoeba* 1895," when he transferred *Entamoeba coli* and other species in vertebrates to the genus *Löschia* and thus left only *Entamoeba blattae* in the genus *Entamoeba*. This conclusion was presumably based on *Opinion* 6, which was invoked in the body of the *Opinion*. Obviously, it was not questioned whether Chatton actually was dealing with *Entamoeba* Casagrandi and Barbagallo, 1895, when he supposedly fixed its type species.

9. I proposed herein to analyze in detail in Sections III and IV, on the summary and body of *Opinion* 99 respectively, the question of the selection of a type species for the genus *Entamoeba* Casagrandi and Barbagallo, 1895, and to show that from the historical facts it must be concluded that no one actually selected its type before Dobell (1919).

III. Analysis of the Summary of "Opinion" 99.

10. First of all it can be shown that the summary of the *Opinion* itself cannot be supported by the *Règles* and previous *Opinions*. The crux of this summary is based upon one point in the general conclusions of the body of the *Opinion*, and in the report by Commissioner K. Jordan, which appears at the end of the discussion on the *Opinion* and was unanimously adopted by the Commissioners present at the Tenth International Congress of Zoology in Budapest, 1927. In this summary, as one can read in the quotation thereof already given, appears the following phrase: "*Entamoeba* 1895, with *blattae* as type by subsequent designation (1912)." This is presumably based on the following statement in Jordan's report (: 8, under "A. Nomenclatorial Con-

siderations"): "In 1912 Chatton separated from *Entamoeba* the species *coli* as genotype of his new genus *Löschia*, leaving *blattae* as only species in *Entamoeba*. As nobody had dealt, nomenclatorially, with *Entamoeba* prior to 1912, Chatton's action made *blattae* the type of *Entamoeba*." Actually Chatton and Lalung-Bonnaire (1912) were the first to do this; Chatton (1912) merely reaffirmed their earlier action.

11. Now the foregoing quotation is an important statement as it suggests that a species may become the "type by elimination." Yet in the present *Règles* (Article 30(k)) the designation of "type by elimination" is only one of a number of non-mandatory *Recommandations*. It is true that under one limited condition the *Opinions* have established that elimination may fix a type species. Thus in *Opinion* 6* (Int. Comm. Zool. Nomencl., 1910, 1944b), the summary reads (in its most recent form—1944b): "When, in the case of a generic name published not later than 31st December, 1930, a later author divided the genus '*A*——', species '*A*—— *b*——' and '*A*—— *c*——', leaving genus '*A*——', only species '*A*—— *b*——', and genus '*C*——', monotypic with species '*C*—— *c*——', the second author is to be construed as having fixed the type of the genus '*A*——'." But, as pointed out by Mr. Francis Hemming, Secretary to the Commission, in his editorial notes on the new edition of *Opinion* 6 (1944b: 134–135), the above summary is explicit in limiting its jurisdiction to the case where the original genus "*A*——" has two species and two species only, and the second genus "*C*——" is monotypic.†

12. Let us suppose then, for the sake of argument, that Chatton and Lalung-Bonnaire (1912) comprehended *Entamoeba* Casagrandi and Barbagallo, 1895, when they transferred species from "*Entamoeba*" to *Löschia*. In this light one finds that *Entamoeba* Casagrandi and Barbagallo, 1895, qualifies as genus "*A*——" in the sense of *Opinion* 6—with two species "*Amoeba coli*" and "*Amoeba blattarum*." However, Chatton and Lalung-Bonnaire's genus

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* Now cancelled, except for historical purposes, and its decision incorporated into the *Règles* (see 1950, *Bull. zool. Nomencl.*, **4**: 157, 165–166).

† Prior to the Congress of 1948, not all workers agreed with Mr. Hemming that *Opinion* 6 need be so narrowly interpreted. Thus Sabrosky (1947) analyzed the body of the *Opinion* and pointed out that in paragraph 2 the statement was made that "cases which were as clear as the one given in the diagram [*i.e.*, the scheme presented in the summary] should be construed under Article 30(g), namely, that the type of the original genus was fixed when, through a division of its species, it was definitely made into a monotypic genus." It was Sabrosky's contention on the basis of this statement that a genus "*A*———" need not have two species in order to come under the jurisdiction of *Opinion* 6, so long as all but one species have been removed by some subsequent worker, thus leaving "*A*———" monotypic. Sabrosky's interpretation is a reasonable one. However, the summary of *Opinion* 6, as it stands, conveys no such flexibility of interpretation and must, it seems to me, be the principal arbiter of the point. Moreover, the International Commission at Paris recommended in its report, which was accepted by the Thirteenth International Congress, *inter alia*, the insertion in Article 30, Rule (g), of words to convey the substance of the summary of *Opinion* 6, *i.e.*, only the limited interpretation thereof (see 1950, *Bull. zool. Nomencl.* **4**: 157); moreover, *Opinion* 6 has now been cancelled for interpretative purposes (see Footnote 10).

" *C*—— " in the sense of *Opinion* 6 would be *Löschia*, which emphatically was not monotypic. The vital point here is that it was formed for four species in two subgenera : *Löschia* and *Viereckia*.

13. It may be claimed that, in effect, *Opinion* 99 established a new precedent and extended the application of selection of " type by elimination " beyond *Opinion* 6. But it does not appear that such was the intention of Commissioner Jordan or of Secretary Stiles. Actually they were merely invoking *Opinion* 6 as the following quotations from the body of the discussion on the *Opinion* indicates : (p. 6, ¶ 3) " . . . . accordingly, for Chatton *Endamoeba* 1879 and *Entamoeba* 1897 were simple orthographic variants and it is not at all impossible (renaming and *cf. Opinion* 6) " [italics mine—E. C. D.] " to construe his papers (1910, 282, and 1912, 110) as a designation of *blattae* as type of *Entamoeba* Casagrandi and Barbagallo, 1897 " ; (P. 7, ¶ 2 (d)) " since (under *Opinion* 6) Chatton's paper (1912, *Bull. Soc. zool. France :* 113) is to be interpreted as designating *blattae* as type of " *Entamoeba* " 1897 (=1895), [emendation of *Endamoeba*, but obviously construed as identical with *Entamoeba*] . . ." But *Opinion* 6, as it is now understood, does not apply here. It is clear that the Commission based the most vital part in the summary of *Opinion* 99 on an invocation of a previous ruling, which at the time was, at best, of questtionable application and must now be regarded as erroneously applied (see footnote 11).

IV. Analysis of the Body of " Opinion " 99.

14. Since it has been demonstrated that the summary of *Opinion* 99 and in effect its conclusions are based on false premises, it would be well to examine the other points discussed in the body of *Opinion* 99 and to analyze the historical facts to determine why, as I consider, (1) no other and justifiable grounds exist for an equivalent decision—namely, that of the type *Entamoeba* Casagrandi and Barbagallo, 1895, was fixed as *Amoeba blattae* Bütschli, 1878 ; and (2) why a type selection was not made until Dobell's work (1919).

15. Dobell (1938) has published a critique of *Opinion* 99 in which he has pointed out certain fundamental inconsistencies in the presentation and body of the *Opinion*, but has not considered all of the basic nomenclatorial issues involved. Kirby (1945)[1] has aired most of the fallacies of the *Opinion*. My analysis is partly an extension of his, with additional observations on applications of certain provisions of the *Règles* and *Opinions*. Dobell's works (1919, 1938) have been indispensable for their complete accounts of the history and zoology of the enteric amoebae of Man.

16. There are three principal statements or assumptions in the body of *Opinion* 99 that deserve attention. These may be summarized as follows :—

(i) The point, not brought out in the " Summary," but nevertheless

[1] See pp. 130 — 139 of the present volume, where Professor Kirby's paper is reprinted.

expressed by Secretary Stiles in several places in his discussion—that *Entamoeba* is a virtual homonym of *Endamoeba*. This was summarised by Commissioner K. Jordan under "Philological Considerations" (: 8) as follows: "In zoology the prefixes *Ento*— and *Endo*— are frequently interchanged. In zoological terminology they are located as being identical. They come under the category of names of which the spelling in Latin varied to a slight extent and which the Rules of Nomenclature do not accept as different, such as *auctumnalis* and *autumnalis* . . . *Entamoeba* is philologically the same as *Endamoeba*." Despite this conclusion, the body of the discussion (: 5, ¶ 4) contains evidence that the prefixes *endo*— and *ento*— can be regarded as of different Greek origin (from ἔνδον and ἐντός respectively).

(ii) The point that Chatton's emendation *Entamoeba* (1910) of Leidy's *Endamoeba* (1875) automatically takes the same type, *Amoeba blattae* (: 6, ¶ 2). "*Endamoeba* Leidy, 1879a, p. 300, has for its monotype *Amoeba blattae*. The generic name was emended by Chatton, 1910, Ann. Zool. exp. gén., 282, and 1912, Bull. Soc. Zool. France, p. 110, to read *Entamoeba*, and by Chatton and Lalung, 1912, BSPe, p. 142, in the same sense. Accordingly, there is a generic name *Endamoeba* and one *Entamoeba* with the same species (*E. blattae*) as type."

(iii) The point that Brumpt (1913) among others may be regarded as having selected the type species of *Entamoeba* Casagrandi and Barbagallo, 1895 (: 6, ¶ 2). " . . . The first type designation in words was by Brumpt (1913, p. 21) as *Entamoeba hominis* which is *Amoeba coli* renamed."

17. Of these three points the first has been demonstrated to be incorrect by Dobell (1938) and Kirby (1945); the second is demonstrably true; and the third is equivocal. All three are taken up in order in the following three sub-sections ((a) to (c)).

(a) Orthographic independence of *Endamoeba* and *Entamoeba*.

18. As Dobell (1938) pointed out, the *Règles* themselves provide a basis for accepting both *Endamoeba* and *Entamoeba*. Article 34 states that "a generic name is to be rejected as a homonym when it has previously been used for some other genus of animals." In connection with rejection of such names as homonyms, Article 36 contains the following recommendation: "It is well to avoid the introduction of new generic names which differ from generic names already in use only in termination or in a slight variation in spelling. But when once introduced, such names are not to be rejected on this account. Examples: *Picus, Pica*. . . ."

19. But, if one may question the legal force of a "Recommendation,"

then *Opinion* 147* (Int. Comm. Zool. Nomencl., 1943), as Kirby (1945) has pointed out, specifically delimits the categories of spellings that render generic names homonyms, to those differing by : (1) the use of " ae," " oe," and " e " ; the use of " ei," " i," and " y " ; or the use of " c " and " k " ; (2) the aspiration or non-aspiration of a consonant ; (3) the presence or absence of a " c " before a " t " ; and (4) the use of a single or double consonant. The difference between the prefixes *Endo*— and *Ento*— thus lies outside of the limits imposed by *Opinion* 147.

(b) Selection of type species for *Entamoeba* Chatton, 1910.

20. Kirby has pointed out that Chatton (1910) referred to the genus *Endamoeba* Leidy, 1879, as " *Entamoeba* Leidy." As used by Chatton, it included, as already noted, the type species of Leidy's genus, *Amoeba blattae* Bütschli, 1878, and a number of other species, among them " *Amoeba coli* Lösch" [=*Amoeba coli* Grassi, 1879]. I believe that Chatton unintentionally changed the spelling of Leidy's genus, thus in effect creating a new name for it, which should be termed *Entamoeba* Chatton, 1910. (No previous author spelled Leidy's genus in this way, Schaudinn (1903) and others that used the spelling *Entamoeba* having credited it to Casagrandi and Barbagallo.) Stiles and Boeck (1923 : 123) must have come essentially to the same conclusion when they recognised both *Entamoeba* Casagrandi and Barbagallo, 1895, and *Entamoeba* Chatton, 1912 [=1910]. Their action supports my contention that Chatton thus was actually not dealing with the genus *Entamoeba* Casagrandi and Barbagallo, 1895, his only reference to the latter being in error—namely, that " *Entamoeba* " should be credited to Leidy, not to the Italian workers. *Entamoeba* Chatton, 1910, is a homonym of *Entamoeba* Casagrandi and Barbagallo, 1895 ; but there is no basis for assuming them to be objective synonyms, as the writers of *Opinion* 99 appear to have believed, inasmuch as the type species of the latter genus had not then been determined.

21. We thus actually have three nominal genera : *Entamoeba* Leidy, 1879 (monotypic), *Entamoeba* Casagrandi and Barbagallo, 1895 (2 species), and *Entamoeba* Chatton, 1910 (7 species, including those in the second genus). As Kirby has maintained, the consequence of any action by Chatton (1910, 1912) and Chatton and Lalung-Bonnaire (1912) should affect only the genus with which Chatton originally dealt—which I call *Entamoeba* Chatton, 1910 (=*Endamoeba* Leidy, 1879, emended). This principle was expressly recognized by the Paris Congress of 1948 and is now to be incorporated in the *Règles* (see 1950, *Bull. zool. Nomencl.* **4** : 347–348).

22. I wish now to take up the second point raised by the body of *Opinion* 99, namely, whether Chatton (1910) can be construed as having fixed the type of *Entamoeba* Chatton, 1910. In this connection Article 30 (f) is involved.

* Cancelled, except for historical purposes, and part of its decision to be incorporated into the *Règles* (see 1950, *Bull. zool. Nomencl.*, **4** : 161–162, 165–166).

23. Article 30 Rule (f) states that " in case a generic name without originally designated type is proposed as a substitute for another generic name, with or without type, the type of either, when established, becomes *ipso facto* type of the other." Inasmuch as *Entamoeba* Chatton, 1910, is in effect a substitute for *Endamoeba* Leidy, 1879, it follows that *blattae*, type of the earlier genus by monotypy, automatically becomes type of the latter genus. Therefore, it is difficult to understand why the Commission, in the summary of *Opinion* 99, did not rely on this rule to establish the type species of *Entamoeba* of Chatton (1910) instead of invoking *Opinion* 6, which was not clearly applicable. Actually, Rule (f) in Article 30 has certain difficulties of application to which I hope to draw the attention of the Commission in a separate communication. Possibly it is on the basis of these difficulties that the Commissioners failed to invoke it in the summary of *Opinion* 99. In any event, the application of this rule seems straightforward in the case under consideration.

(c) Selection of a type species for *Entamoeba* Casagrandi and Barbagallo, 1895.

24. We can now examine the third point raised by the body of *Opinion* 99, namely, that Brumpt (1913) may be regarded as having made a statement that, were it not for Chatton's earlier action (1912), would have had the effect of selecting a type species for *Entamoeba* Casagrandi and Barbagallo, 1895. In this connection it also is desirable to determine when such a selection was validly made and also to explore further the consequences of Chatton's treatment of his genus *Entamoeba* (=*Endamoeba* Leidy, 1879). Aside from *Opinion* 6, which has already been shown to be inapplicable, one article in the *Règles* and two *Opinions* are intimately involved in these problems—namely, Article 30 and *Opinions* 45 and 164.

25. Brumpt (1913), as already stated, made the following statement (in translation ; for original see footnote 8) : " This same genus " [as *Entamoeba* Chatton, 1910=*Endamoeba* Leidy, 1879] " was created *de novo* in 1897 by Casagrandi and Barbagallo for their *E. hominis*, synonym of *E. coli*." It was on this basis that Stiles and Boeck (1923), Stiles and Hassall (1925), and the Commission (in *Opinion* 99) concluded that what Brumpt's statement amounted to was a potential selection of a type species for *Entamoeba* Casagrandi and Barbagallo, 1895.

26. I feel that this position is inconsistent with the *Règles* and with the previously rendered *Opinion* 45 (Int. Comm. Zool. Nomencl., 1912).

27. Article 30, which deals with the designation, indication, and selection of type species of genera, contains a paragraph following paragraph (g) which reads as follows : " The meaning of the expression ' select the type ' is to be rigidly construed. Mention of a species as an illustration or example of a genus does not constitute a selection of type." Several *Opinions* have been rendered specifically dealing with the concept of type selection " rigidly construed." Most of these do not apply to the present case except that all up to *Opinion* 99

demonstrate a strict approach to the question of type selection. *Opinion* 45, however, is of considerable significance to the question under consideration.

28. The summary of *Opinion* 45 reads as follows: "So far as one can judge from the premises submitted, the type of *Syngnathus* Linnaeus, 1758, has never been definitely designated, and there is no objection to designating, as such, the species *acus* Linnaeus to accord with general custom and convenience." Without going into the entire history of this case it can be briefly stated that the genus *Syngnathus* Linnaeus, 1758, with seven original species was restricted by Rafinesque (1810b) to two species—a Linnaean species, *Syngnathus aequoreus*, hence the only one of the original species, and a new species, *Syngnathus punctatus* Rafinesque, 1810. He did not select a type species, nor had any previous author. No type selection was made during the rest of the 19th century. However, Jordan and Evermann (1896 : 774) gave in the synonymy of "*Syngnathus*, Linnaeus" the following citation: "*Syngnathus*, Rafinesque, Caratteri, 18, 1810 (restricted to *aequoreus*)." Actually, as is pointed out in *Opinion* 45, Rafinesque (1810a), in the reference cited by Jordan and Evermann, did not mention the genus *Syngnathus ;* this was done in the later work (1810b). It was the conclusion of the Commission that Jordan and Evermann did not thereby select a type species for the genus *Syngnathus* Linnaeus, 1758.

29. Now it seems to me that the cases of *Syngnathus* of Jordan and Evermann (1896) and *Entamoeba* of Brumpt (1913) are parallel. In both cases statements, not strictly accurate, were made by later authors about the genera of earlier workers. In neither case was there an unequivocal selection of a type species. Yet the Commission saw fit in the first case to determine that Jordan and Evermann's statement, "restricted to *aequoreus*," was not, "'rigidly construed,'" a type selection, whereas Brumpt's statement, "created *de novo* . . . for . . . *E. hominis*", was such a selection. As indicated, Brumpt's statement erred, for actually Casagrandi and Barbagallo raised *Entamoeba* for two species: "*Amoeba coli*" and "*Amoeba blattarum*."

30. *Opinions* 45 and 99 are, I feel, in essential disharmony on the point discussed. Whereas *Opinion* 99 is the later and might be held as superseding *Opinion* 45, the point in which the latter is inconsistent with the former is the fundamental issue of its case and that of *Opinion* 99 is a secondary issue. I do not believe that the International Commission meant, in effect, to reverse *Opinion* 45 in *Opinion* 99. Furthermore I feel that the decision that Brumpt (1913) selected a type species for the genus *Entamoeba* Casagrandi and Barbagallo, 1895, is inconsistent with the spirit of the phrase "rigidly construed" in Article 30.

31. Having considered Brumpt (1913), we can now return to Chatton (1910). A point, the significance of which has not so far been examined, is that the genus *Entamoeba* Chatton, 1910, actually included the two species placed by Casagrandi and Barbagallo in their genus. Some may argue that in so doing Chatton actually comprehended the Italian workers' genus despite his designation "*Entamoeba* Leidy." This is not necessarily so, however.

A genus is rigidly defined by its type species; unless or until a type species is designated or selected, a given genus is of necessity a plastic entity to a greater or lesser degree. Chatton in effect united *both* Leidy's and Casagrandi and Barbagallo's genus in his *Entamoeba*.

32. What happened, in effect, was that Chatton incorrectly—from the standpoint of priority—included *Entamoeba* Casagrandi and Barbagallo, 1895, in synonymy with his *Entamoeba* (1910); no objection from the standpoint of priority would, however, extend to synonymizing the Italian workers' genus with *Endamoeba* Leidy, 1879, the action that he, in fact, meant to take. Despite the fact that Chatton (1910) must be considered as having automatically designated the type species of *Entamoeba* Chatton, 1910 (=*Endamoeba* Leidy, 1879, emended) as *Amoeba blattae* Bütschli, 1878, this should have no effect on the type of *Entamoeba* Casagrandi and Barbagallo, 1895, a genus which was named independently and not as an emendation of Leidy's name "*Endamoeba*" and which Chatton cannot reasonably be regarded as comprehending in his use of the generic name "*Entamoeba*." *Opinion* 164* (Int. Comm. Zool. Nomencl., 1945a) makes this point clear.

33. The summary of *Opinion* 164 states in part as follows: "When two or more genera are united on taxonomic grounds, such action in no way affects the types of the genera concerned." Thus, even though the type species of *Entamoeba* Chatton, 1910, may be regarded as having been designated, that designation cannot, according to *Opinion* 164, affect the type species of *Entamoeba* Casagrandi and Barbagallo, 1895, which Chatton in effect united with his genus.

34. Although Crawley (1913 : 185) listed *Entamoeba histolytica* Schaudinn, 1903, as type species of *Entamoeba*, this cannot be taken as a valid selection of a type species inasmuch as *E. histolytica* was not an originally included species. It is true that the nominal species *Amoeba coli* Lösch, 1875 [=*E. histolytica*], was placed in *Entamoeba* as originally proposed by Casagrandi and Barbagallo (1895), but the organism so identified by them was in actuality the modern *E. coli*.

35. The first unequivocal selection of a type species for *Entamoeba* Casagrandi and Barbagallo, 1895, was made by Dobell (1919 : 17–18) as follows: "I shall therefore continue to refer three of the common amoebae of man—namely, *E. coli*, *E. histolytica*, *E. gingivalis*—to the genus *Entamoeba* Casagrandi and Barbagallo, 1895; whilst provisionally I reserve the separate genus *Endamoeba* Leidy, 1879, for the amoeba of the cockroach. On this system, the type species of *Entamoeba* is *E. coli*, and the type of *Endamoeba* is *E. blattae*." Dobell specifically stated that the *E. coli* so cited was based on Grassi's, not

* Cancelled, except for historical purposes, and its decision incorporated into the *Règles* (see 1950, *Bull. zool. Nomencl.* **4** : 157, 165–166).

on Lösch's organism. For reasons given in Section VI even his selection encounters technical difficulties.

V. The Status of the Trivial Names " coli " of Grassi (1879) and " histolytica " of Schaudinn (1903).

36. It is desirable at this point to bring up two questions which are only partly related to *Opinion* 99, but are nevertheless of great significance to the nomenclature of amoebae in man. These questions are respectively the validity of the trivial name *coli* for the large nondysenteric amoebae of man and the validity of the trivial name *histolytica* for the amoebae of human amoebic dysentery.

37. It is very important to ensure the status of the trivial name *coli*, inasmuch as it is universally applied today to the large nondysenteric amoeba of man, known as *Entamoeba*, or *Endamoeba*, *coli*—the species, moreover, which Dobell has designated as type of *Entamoeba* Casagrandi and Barbagallo, 1895. If this cannot be done under the existing rules, the International Commission must be called upon to exercise their plenary powers.

38. As already pointed out in paragraph 8 (i), the trivial name *coli* appeared first in the description by Lösch (1875) of organisms from a patient suffering with dysentery ; these unquestionably represented the species now designated *Entamoeba*, or *Endamoeba*, *histolytica*. For detailed historical discussions of the nomenclature of *E. coli* and *E. histolytica* I refer to Dobell (1919) and Stiles and Boeck (1923). It should be remarked, however, that Stiles and Boeck (1923) regarded *Amoeba coli* Lösch, 1875, as representing a mixture of species and contended that Stiles (1892) was the first worker to restrict the name to a single component species—the large nondysenteric amoeba. On this basis, they found it possible to accept the trivial name *coli* as valid under the rules for that form. However, Dobell (1919) has presented compelling evidence that Lösch (1875) dealt essentially with *E. histolytica*. It seems entirely logical on the basis of Lösch's usage to regard *coli* as the correct trivial name for the dysenteric amoeba of man. However, Dobell ingeniously found it possible to reject Lösch's selection on the basis of its being a vernacular name without nomenclatorial status. Lösch wrote as follows : " Da die von mir beschriebenen Amöbe, so viel mir bewusst, überhaupt mit keiner der bisher bekannten Formen vollkommen übereinstimmt, so scheint es mir gerechtfertigt, dieselbe bis auf Weiteres mit einem besonderen Namen zu bezeichnen und nach ihrem Fundorte etwa Amoeba coli zu nennen." Dobell pointed out that Lösch's " Amoeba coli " was written in ordinary type, not italicised or spaced ; he further stated that " there is nothing to indicate that Lösch did not employ it as a mere descriptive term." In view of the wording of Lösch's sentence this last statement by Dobell is considerably strained. However, the latter offered a rational solution to a vexing nomenclatorial problem, one which no reasonable systematist, lacking a legal means of rectifying the situation, would hesitate to follow if he wished to honour the *Règles* without contravening general usage. The alternative without suspension of existing rules is to substitute *coli* for *histolytica*, a procedure which would today disrupt the firmly established

practices of two generations of protozoologists and medical scientists. Since this cannot be done in harmony with the rules and since *coli* is so firmly linked with the large nondysenteric amoeba, there appears to be involved a clear case where strict application of the *Règles* would result in confusion rather than uniformity. It is therefore important that *coli* be secured for the large nondysenteric amoeba of man by the International Commission acting on the plenary powers.

39. It would seem quite illogical, however, in securing *coli* to this end for it to be attributed to the authorship of Lösch. Since Grassi (1879) was the first to apply this trivial name to the large nondysenteric amœba, it is reasonable to follow Dobell and attribute it to his authorship. On this basis it is necessary to suppress *coli* of Lösch (1875) and validate the otherwise homonymous *coli* of Grassi (1879).

40. It is very important to ensure the status of the trivial name *histolytica* inasmuch as it is universally applied today to the dysenteric amoeba of man.

41. Though Dobell (1919), as mentioned, reviewed in detail the nomenclatorial history of the dysenteric amoeba of man, I find it impossible to follow him in all of his conclusions. He discussed four names (aside from *Amoeba coli*) as possibly referring to this species, which antedate *E. histolytica* Schaudinn, 1903—*Amoeba urogenitalis* of Baelz (1883, p. 237), *Amoeba vaginalis* of Blanchard (1885, p. 15), *Amoeba intestinalis* of Blanchard (1885, p. 15) and " amoeba dysenteriae " of Councilman and Lafleur (1891, p. 405). Dobell advanced reasons for rejecting each of these—Baelz's and Blanchard's names as unidentifiable and Councilman and Lafleur's as an obviously vernacular name. I have already pointed out that Dobell cannot be followed in his rejection of *Amoeba coli* Lösch, 1875, as a systematic name ; I believe that the same thing can be said for Councilman and Lafleur's " amoeba dysenteriae." They stated : " We have called the organism, which was first described by Lösch under the name *amoeba coli*, the '*amoeba dysenteriae.*' " Inadvertently or through ignorance they merely neglected to capitalize "*amoeba.*" In regard to the other names cited by Dobell, I have no essential disagreement with his disposition of them. However, even if his rejection of Councilman and Lafleur's name were followed, the matter could not rest there, as can be seen by the following statement by him (: 28) : " Whilst it is true that the terms *A. coli* and *A. dysenteriae* were sometimes used correctly as zoological names, yet they were never used with clear specific conceptions before the time of Schaudinn." The first person to use *Amoeba dysenteriae* as an unquestionably systematic designation was Stiles (1892 : 524–525) in a review of Councilman and Lafleur's paper (1891). It is true that Stiles credited this name to the latter authors, but this fact makes it no less available. That this is so is demonstrated in *Opinion* 4* (Int. Comm. Zool. Nomencl., 1907, 1944a), the summary of which reads as follows : " Manuscript names acquire standing in nomenclature when printed in connection with the provisions of Article 25,

* To be cancelled, except for historical purposes, and its decision incorporated into the *Règles* see *Bull. zool. Nomencl.*, **4** : 145–146, 165–166, 1950).

and the question as to their validity is not influenced by the fact whether such names are accepted or rejected by the author responsible for their publication." The discussion by Hemming in the second edition of this *Opinion* (1944a) makes the availability of such a name as *Amoeba dysenteriae* of Stiles (1892) doubly clear.

42. It might seem, therefore, that, if *coli* of Lösch is suppressed as the trivial name for the dysenteric amoeba, *Amoeba dysenteriae* Councilman and Lafleur, 1891 (or Stiles, 1892), would be the next available name. However, Dobell (1919) either did not know about, or ignored, the name *Amoeba dysenterica* used by Pfeiffer (1888 : 662) as a new name for *Amoeba coli* of Lösch.* Stiles and Boeck (1923), in accepting Lösch's name as being restricted by Stiles (1892) to the nondysenteric amoeba, found it possible also to reject *Amoeba dysenterica* Pfeiffer, 1888, and *Amoeba dysenteriae* Councilman and Lafleur, 1891, on the basis that these were renamings of *Amoeba coli* Lösch, 1879, and for that reason had to follow the last name. It is sufficient to point out, since *Amoeba coli* Lösch, 1875, actually applied to the dysenteric species, and on that account alone the other names cited did likewise, Stiles and Boeck's contention is inappropriate. Thus, with the suppression of *coli* of Lösch (1875), *Amoeba dysenterica* Pfeiffer, 1888, is the next unquestionably and validly applied name for the dysenteric amoeba. However, it is impractical to consider substituting *dysenterica* of Pfeiffer (1888) for *histolytica* of Schaudinn (1903). This is clearly a case where strict application of the *Règles* would result in confusion rather than uniformity. The best interests of science will be served by retention of the specific name *Entamoeba histolytica* Schaudinn, 1903 (the next available name for the dysenteric amoeba after *Amoeba dysenterica* Pfeiffer, 1888, and *Amoeba dysenteriae* Councilman and Lafleur, 1891), the trivial name *histolytica* now being universally employed in the zoological and medical fields. In so doing the International Commission must suppress all previous potential or actual synonyms of the trivial name *histolytica*.

43. It is highly important that the International Commission give attention to the names of these important amoebae in man. A formal recommendation in that connection is made in the final section of this paper.

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* Pfeiffer wrote : " Im Jahr 1875 folgt alsdann die erste ausführliche und genaue Beschreibung von Lösch in St. Petersburg . . . Dessen Amoeba coli s. dysenterica Lösch hat so viel Aehnichkeit mit den aus dem Bläscheninhalt von Vaccine, Herpes, Varicella, etc., abgebildeten grossen Zellgebilden dass morphologisch und nach den Bewegungserscheinungen keine Trennung möglich ist." [" In 1875 then follows the first detailed and precise description—by Lösch in St. Petersburg . . . *Amoeba coli* or *dysenterica* Lösch has so much similarity to the large cell structures that have been pictured with the vesicular inclusions of vaccinia, herpes, varicella, etc., that no distinction is possible, either morphologically or on the basis of the appearance of their movements."] In subsequent discussion Pfeiffer referred to Lösch's form as *Amoeba coli* rather than *Amoeba dysenterica*. Lösch did not employ the word " dysenterica " as a trivial name; that name must therefore be credited to Pfeiffer.

VI. The status of the generic names "Endamoeba" Leidy, 1879, "Entamoeba" Casagrandi and Barbagallo, 1895, and certain others applied to Enteric Amoebae.

44. The genus *Endamoeba* Leidy, 1879, with its type species *Amoeba blattae* Bütschli, 1879, has already been placed on the "Official List of Generic Names in Zoology" in *Opinion* 95 (Int. Comm. Zool. Nomencl., 1926). This action is completely supported by the *Règles*.

45. The genus *Entamoeba* Casagrandi and Barbagallo, 1895, has been shown to be independent of *Endamoeba* on an orthographic basis. However, its exact nomenclatorial status has not yet been considered herein. At this point it is necessary to consider the status of *Entamoeba coli* as type species of *Entamoeba*. We have already seen (paragraph 8 (v)) that the Italian workers originally included in their genus the species "*Amoeba coli* (Lösch)" and "*Amoeba blattarum* (Bütschli)" [=*Amoeba blattae* Bütschli]. But the organism called "*Amoeba coli*" by them and later (Casagrandi and Barbagallo, 1897) renamed *Entamoeba hominis* was clearly not the dysenteric amoeba, to which Lösch's name applied, but the large nondysenteric form. Thus Dobell in selecting *Amoeba coli* as the type species of *Entamoeba* Casagrandi and Barbagallo, 1895, was so doing on the basis of an originally misidentified species. It is true that he corrected the initial error by properly identifying the species that the Italian workers had misidentified. However, the case still requires the attention of the Commission as prescribed in *Opinion* 168* (Int. Comm. Zool. Nomencl. 1945b), the title of which reads "On the principles to be observed in interpreting Article 30 of the International Code in relation to the names of genera based upon erroneously determined species. . . ." In the summary it is requested that, where such a case has been discovered, it "should be submitted with full details to the International Commission on Zoological Nomenclature and . . . that, pending their decision thereon, the genus should be regarded as a doubtful status." It may be remarked here that what is true of *Entamoeba* Casagrandi and Barbagallo, 1895, is equally true of *Löschia* Chatton and Lalung-Bonnaire, 1912, for which "*E. coli* Lösch" [=*Amoeba coli* Grassi, 1879] was also designated as the type species.

46. It therefore follows that *Entamoeba* Casagrandi and Barbagallo, 1895 (as also *Löschia* Chatton and Lalung-Bonnaire, 1912), as a genus based on a misidentified type species, is technically of doubtful status. Actually, there is no question of the practical application of either *Entamoeba* or *Endamoeba* to certain enteric amoebae of man; such is essentially universal. But it is important that the matter be legally clarified.

47. The question may well arise in view of the general confusion in the medical literature over the spelling of the genus used for the dysenteric and large nondysenteric amoebae of man, *Endamoeba* being quite general in the

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* Cancelled, except for historical purposes, and its decision incorporated into the *Règles* (see 1950, *Bull zool. Nomencl.*, **4**: 158–159, 165–166).

United States and *Entamoeba* in Britain, whether there ought to be independent genera *Endamoeba* and *Entamoeba*, which have been accepted as such by Dobell (1938), Kirby (1945), and others. Admittedly the close similarity of the names is regrettable. However, from the practical standpoint, no real difficulty should be encountered, for *Endamoeba blattae* and its congeners, being parasitic in insects, are of no particular consequence to medical scientists. Those zoologists that deal with insect parasites can be expected to be familiar with their nomenclature and are not likely to confuse the two genera ; whereas the spelling *Endamoeba* as applied to amoebae in vertebrates may be some time a-dying in the general medical literature, this fact need not disturb scholars concerned with the real genus *Endamoeba*. There does not seem, therefore, to be any real objection to the coexistence of two independent genera with the names *Endamoeba* and *Entamoeba*.

48. The way thus seems well indicated. The International Commission should validate *Entamoeba* Casagrandi and Barbagallo, 1895, a genus based on an originally misidentified species as type species, for which the species *Amoeba coli* Grassi, 1879 (non Lösch, 1875) should be designated, Dobell's selection being thereby validated.

49. Dobell (1938) expressed the conviction that the dysenteric and non-dysenteric amoebae of man should be placed in separate genera. Although he has not himself done this formally, it would also be well for the International Commission to recognise the generic name that would-be used for the dysenteric amoeba in case the proposed separation becomes generally recognised. As mentioned in paragraph 8 (vii), *Poneramoeba* was erected by Lühe (1909) with *Entamoeba histolytica* Schaudinn, 1903, as only species and therefore as type species. As first genus after *Entamoeba* available for the dysenteric amoeba, it would come into use. The International Commission might also permanently sink *Löschia* Chatton and Lalung-Bonnaire, 1912, by validating *Amoeba coli* Grassi, 1879, as its type species, thereby rendering it an objective synonym of *Entamoeba* Casagrandi and Barbagallo, 1895.

50. *Entamoeba* Casagrandi and Barbagallo, 1895, and *Poneramoeba* Lühe, 1909, with their respective type species, should therefore join *Endamoeba* Leidy, 1859, on the " Official List of Generic Names in Zoology."

VII. Conclusions and Recommendations.

51. The conclusions and recommendations of the present study are in three categories : those that relate to *Opinion* 99 itself ; those that relate to the trivial names *coli* and *histolytica ;* and those that relate to the generic names *Entamoeba* Casagrandi and Barbagallo, 1895, and *Poneramoeba* Lühe, 1909. The first are covered under paragraph 52 ; the second under paragraphs 53-55 ; and the third under paragraph 56.

52. I feel that it is necessary, and I hereby request, that the International Commission on Zoological Nomenclature should render an *Opinion* in which they first cancel *Opinion* 99 on the ground that the decision set forth therein is incorrect and misleading in certain important respects, and second make the following points, in substitution for those made in the *Opinion* so cancelled :

(i) The nominal genus *Entamoeba* Casagrandi and Barbagallo, 1895, was established independently of the nominal genus *Endamoeba* Leidy, 1879, the name *Entamoeba* as used by Casagrandi and Barbagallo being neither an accidental misspelling nor an emendation of the name *Endamoeba* as previously used by Leidy. Under Articles 34 and 36, the names *Endamoeba* and *Entamoeba* are not homonyms of one another.

(ii) Chatton (1912) did not select a type species for the genus *Entamoeba* Casagrandi and Barbagallo, 1895. In fact the supposed action of Chatton (1912) on the basis of which type selection was to be inferred according to the *Opinion* actually was originally carried out by Chatton and Lalung-Bonnaire (1912). The genus with which these authors had dealt was *Endamoeba* Leidy, 1879, to which Chatton himself in 1910 had applied the name *Entamoeba* as a tacit emendation of the name *Endamoeba*. Further, even if Chatton and Lalung-Bonnaire (1912) had been dealing with *Entamoeba* Casagrandi and Barbagallo, 1895, instead of with *Entamoeba* Chatton, 1910 (*emend. pro Endamoeba* Leidy, 1879), the action which they then took would not have constituted a valid selection of *Amoeba blattae* Bütschli, 1878, as the type species of that genus, for they did not make a definite type selection under Rule (g) in Article 30, nor did their action constitute such a selection under the special provisions of *Opinion* 6.

(iii) Brumpt's action in 1913 did not constitute a valid selection of a type species for *Entamoeba* Casagrandi and Barbagallo, 1895, for Brumpt did not comply with the requirements of Rule (g) in Article 30.

(iv) The first author definitely to select a type species for *Entamoeba* Casagrandi and Barbagallo, 1895, was Dobell (1919), who so selected *Amoeba coli* Grassi, 1879. This selection has been accepted by subsequent authors, but it must be noted that Casagrandi and Barbagallo (1895) did not include this nominal species in the genus *Entamoeba*, the name which they did so include being " *Amoeba coli* (Lösch)," which is the name for a different species, being the dysenteric amoeba of man now universally known as *Entamoeba histolytica* Schaudinn, 1903. On the other hand, it cannot be doubted that the species which Casagrandi and Barbagallo referred to as " *Amoeba coli* (Lösch) " was the species now universally identified as the large nondysenteric amoeba of man, *Amoeba coli* Grassi, 1879. Thus, the genus *Entamoeba* Casagrandi and Barbagallo, 1895, is one based on a misidentified type species. In these circumstances the Commission, acting under the instructions given to it by the International Congress of Zoology as to the action to be taken in any such case where the Commission is satisfied that

confusion would result from the strict application of the *Règles*, should hereby use their plenary powers to designate *Amoeba coli* Grassi, 1879, to be the type species of the genus *Entamoeba* Casagrandi and Barbagallo, 1895, thus validating Dobell's selection.

53. It is necessary, if serious confusion is to be avoided, that the trivial names of the large nondysenteric and the dysenteric amoebae of man should be placed on an unassailable foundation. The problems arising in connection with the specific names *Amoeba coli* Grassi, 1879, and *Entamoeba histolytica* Schaudinn, 1903, are accordingly summarized in the following paragraphs.

54. Two points arise in connection with the name *Amoeba coli* Grassi, 1879 : (1) whether this is an available name ; and (2) whether it undoubtedly represents the large nondysenteric amoeba of man. As regards (1), the name *Amoeba coli* Grassi, 1879, is not an available name because of the prior *Amoeba coli* Lösch, 1875, which applies to the dysenteric amoeba. However, in view of the universal use of *coli* for the nondysenteric amoeba and the grave confusion which would result if this name had now to be discarded on technical nomenclatorial grounds, I recommend that this particular difficulty should be overcome by the Commission using its plenary powers to suppress the trivial name *coli* Lösch, 1875 (as published in the binominal combination *Amoeba coli*) and validate the trivial name *coli* Grassi, 1879 (as published in the binominal combination *Amoeba coli*). As regards (2), there is no reasonable doubt as to the principal species to which Grassi applied the name *coli*, but I recommend that, in order to settle this matter beyond dispute, the Commission should apply in this case the procedure which they adopted in Paris for the purpose of determining the identity of the species to which the trivial name *iris* Linnaeus, 1758 (as published in the binominal combination *Papilio iris*) should apply (see 1950, *Bull. zool. Nomencl.* **4** : 359–361)—that is, that the Commission should use its plenary powers to direct that the name *coli* Grassi, 1879 (as published in the binominal combination *Amoeba coli*) should be the trivial name of the large nondysenteric amoeba of man as definitively described and figured by Dobell (1919, pp. 78-92 ; pl. i, figs. 12-15 ; pl. ii, fig. 17 ; pl. iv, fig. 55-69).

55. The name *Entamoeba histolytica* Schaudinn, 1903, is universally applied to the dysenteric amoeba of man and the greatest confusion would result if it were necessary to change this practice for some technical nomenclatorial reason. On the other hand, there is no doubt that there are at least three older names for this species, namely, *Amoeba coli* Lösch, 1875, *Amoeba dysenterica* Pfeiffer, 1888, and *Amoeba dysenteriae* Councilman and Lafleur, 1891 (or Stiles, 1892). In addition, there are three other names which may have been applied to this species, namely : (1) *Amoeba urogenitalis* Baelz, 1883, (2) *Amoeba vaginalis* Blanchard, 1885, and (3) *Amoeba intestinalis* Blanchard, 1885. Accordingly, in order to provide an unquestionably valid title for the trivial name *histolytica* Schaudinn, 1903 (as published in the binominal combination *Entamoeba histolytica*), I recommend that the Commission, in addition to suppressing the trivial name *coli* Lösch, 1875 (as published in the binominal combination *Amoeba coli*), as recommended in paragraph 54 above, should

use their plenary powers to suppress the under-mentioned trivial names and, having done so, should place those names (with *coli* Lösch, 1875) on the " Official Index of Rejected and Invalid Specific Trivial Names in Zoology ": (a) *urogenitalis* Baelz, 1883 (as published in the binominal combination *Amoeba urogenitalis*) ; (b) *vaginalis* Blanchard, 1885 (as published in the binominal combination *Amoeba vaginalis*) ; (c) *intestinalis* Blanchard, 1885 (as published in the binominal combination *Amoeba intestinalis*) ; (d) *dysenterica* Pfeiffer, 1888 (as published in the binominal combination *Amoeba dysenterica* ; and (e) *dysenteriae* Councilman and Lafleur, 1891 (or Stiles, 1892) (as published in the binominal combination *Amoeba dysenteriae*). Finally, as in the case of the trivial name *coli* Grassi, 1879, I recommend that the Commission should use its plenary powers definitely to attach the trivial name *histolytica* Schaudinn, 1903 (as published in the binominal combination *Entamoeba histolytica*) to the dysenteric amoeba of man as now recognized by specialists. I recommend that this object should be secured by the Commission directing that the trivial name *histolytica* Schaudinn, 1903, is to be the trivial name for the species as definitively described and figured by Dobell (1919, pp. 31-70 ; pl. i, figs. 1-6 ; pl. ii, fig. 16 ; pl. iii ; pl. iv, figs. 70-76).

56. While it is of the first importance that the trivial names of these amoebae should be firmly established, it is also necessary that the generic name *Entamoeba* Casagrandi and Barbagallo, 1895, be stabilized by being placed on the " Official List of Generic Names in Zoology " (type species *Amoeba coli* Grassi, 1879 [syn. *Entamoeba coli* (Grassi, 1879) Schaudinn, 1903], to be validated by the International Commission through the invocation of their plenary powers). In view of the fact that such an authority as Dobell felt that generic separation of the dysenteric and large nondysenteric amoeba of man will have to be carried out, it would also be well for the International Commission to place *Poneramoeba* Lühe, 1909 (type species *Entamoeba histolytica* Schaudinn, 1903, by original designation), first genus available for the dysenteric amoeba of man, on the " Official List." These two generic names would thereby join *Endamoeba* Leidy, 1879 (type species *Amoeba blattae* Bütschli, 1878 [syn. *Endamoeba blattae* (Bütschli, 1878) Leidy, 1879], by monotypy), already placed on the " Official List " under a decision taken in *Opinion* 95. The foregoing actions are hereby recommended.

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REPORT ON THE INVESTIGATION OF THE NOMENCLATORIAL PROBLEMS ASSOCIATED WITH THE GENERIC NAMES "ENDAMOEBA" LEIDY, 1879, AND "ENTAMOEBA" CASAGRANDI & BARBAGALLO, 1895 (CLASS RHIZOPODA)

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(Commission's reference Z. N. (S.) 185)

1. The need for a thorough review of the ruling in regard to the status of the generic name *Entamoeba* Casagrandi and Barbagallo, 1895 (Class Rhizopoda) in relation to the name *Endamoeba* Leidy, 1879, dealt with in the *Opinion* previously rendered by the International Commission on Zoological Nomenclature as *Opinion* 99, was first formally brought to the attention of the Commission in January, 1945, when Professor Harold Kirby (University of California, Berkeley, California, U.S.A.) submitted a paper entitled "*Entamoeba coli* versus *Endamoeba coli*," in which he drew attention to what appeared to be a serious error in that *Opinion*.

2. Owing to wartime difficulties, it was not possible at that time at once to publish Professor Kirby's paper in the *Bulletin of Zoological Nomenclature* and it was accordingly arranged that, in order to draw the attention of interested protozoologists to the nomenclatorial issues involved, Professor Kirby's paper should (as already contemplated) be published as soon as possible in the *Journal of Parasitology* and that it should be republished in the *Bulletin of Zoological Nomenclature* as soon as it was possible to submit this case to the International Commission for consideration. Not long afterwards, Professor Kirby's paper duly appeared (June, 1945, *J. Parasit.* **31** : 177-184). At my suggestion, Professor Kirby added a footnote, in which he explained that the problem dealt with in that paper had been submitted to the International Commission for decision and invited any specialist who might wish to comment on the conclusions reached in that paper to send those comments direct to myself, as Secretary to the Commission.

3. In July, 1946, Dr. Ellsworth C. Dougherty (University of California, Berkeley, California, U.S.A.) submitted to the Commission a paper in which he accepted the conclusions reached by Professor Kirby and brought forward additional matters which appeared to call for consideration.

4. *Notice given in* 1947 *of the possible use of the plenary powers in the present case :* Notice of the possible use of the plenary powers in this case was given in November 1947 to the journals *Science* and *Nature* and was published shortly thereafter. This notice, like the footnote attached to Professor Kirby's paper of 1945, failed to elicit any objections. Thus, by the time that the International Commission met in Paris in July, 1948, there were strong grounds for believing that a revision of *Opinion* 99 on the lines suggested would be in

accordance with the general wishes of protozoologists.

5. *Preliminary action taken by the International Commission in Paris in* 1948 : The attention of the International Commission was drawn to this question during its Session held in Paris in 1948 in Commission Paper I.C. (48) 17 (1950, *Bull zool. Nomencl.* **3** : 128), which was considered by the Commission at its Twelfth Meeting during that Session (Paris Sessions, 12th Meeting, Conclusion 22 (4)) (1950, *Bull zool. Nomencl.* **4** : 338). The Commission then recommended—and the Congress agreed—that the decision in *Opinion* 99 (unlike the decisions in other *Opinions*) should not be recorded in the Schedule to the *Règles* then established for the recording of such decisions, until after the subject matter of that *Opinion* had been thoroughly reviewed and that, pending the outcome of that review, the questions dealt with in *Opinion* 99 were to be regarded as being *sub judice.*

6. *Review of the decision given in " Opinion "* 99 : Since the Paris Congress Dr. Dougherty has thoroughly reviewed both the literature of the amoebae of man dealt with in the present Report and the conclusions in regard to the names published for those species (both at the genus level and at the species level) given in *Opinion* 99. This investigation has confirmed the conclusions which he and Professor Kirby had previously reached and has brought to light certain other supplementary matters which will also need to be dealt with before the nomenclature of these species can be placed on a sound legal footing. Dr. Dougherty has accordingly revised his earlier paper to take account of these additional considerations. At the same time he has drafted the concluding recommendations, so as to secure that they deal with all the matters (relating to the placing on *Official Lists* and *Official Indexes* of names dealt with in *Opinions*) which the Paris Congress decided should in future be dealt with in cases of this kind.

7. *Close parallel between the history of the names published for the amoebae of man and that of the names published for the malaria parasites of man :* The data submitted by Professor Kirby and Dr. Dougherty amply justify the decision taken by the Commission in Paris to review the ruling given in *Opinion* 99, for they disclose a tissue of errors and misconceptions in that *Opinion.* The history of the names published for the amoebae of man, as set forth in the documents now submitted, shows a remarkable similarity with the history of the names published for the malaria parasites of man ; in each case, the universal practice of protozoologists for the last half century has been totally at variance with the provisions of the *Règles ;* in each case, it was Schaudinn who was principally responsible for the nomenclatorial errors which have become so deeply embedded in protozoological and medical literature ; in each case, the Commission attempted (in the case of the names of the amoebae of man, in *Opinion* 99 ; in the case of the malaria parasites of man, in *Opinion* 104) to reach a settlement without recourse to the plenary powers, the only difference in this regard between these two cases being that in the latter case the Commission sought to give valid force to the current practice of protozoologists, while in the former it did not.

8. *Action recommended :* During its Paris Session the International Commission corrected the errors previously made in regard to the names of the malaria parasites of man (see 1950, *Bull zool. Nomencl.* **4** : 594-624) and it is clearly desirable that a corresponding correction of the errors made in regard to the names of the amoebae of man should now be made as quickly as possible, in the light of the data submitted by Professor Kirby and Dr. Dougherty, the object of the action so taken being to give valid force to the current nomenclatorial practice of protozoologists and to avoid the appalling confusion which would result from any attempt strictly to apply the *Règles* to those names. In order to correct the errors in *Opinion* 99 and to deal fully with the associated nomenclatorial problems (as was done when a corresponding correction was made of errors in regard to the names of the malaria parasites of man), it would be necessary for the International Commission to take—and I recommend that it should take—action on the following lines :—

(1) cancel *Opinion* 99 as incorrect and misleading ;

(2) use its plenary powers :—

(a) to suppress :—

(i) for the purposes both of the Law of Priority and also of the Law of Homonymy, the trivial name *coli* Lösch, 1875 (as published in the binominal combination *Amoeba coli*) :

(ii) for the purposes of the Law of Priority but not for those of the Law of Homonymy, the under-mentioned trivial names :—

(α) *urogenitalis* Baelz, 1883 (as published in the binominal combination *Amoeba urogenitalis*) :

(β) *vaginalis* Blanchard, 1885 (as published in the binominal combination *Amoeba vaginalis*) :

(γ) *intestinalis* Blanchard, 1885 (as published in the binominal combination *Amoeba intestinalis*) :

(δ) *dysenterica* Pfeiffer, 1888 (as published in the binominal combination *Amoeba dysenterica*) :

(ε) *dysenteriae* Councilman and Lafleur, 1891 (as published in the binominal combination *Amoeba dysenteriae*) :

(b) to direct that the trivial name *histolytica* Schaudinn, 1903 (as published in the binominal combination *Entamoeba histolytica*): is to be applied to the large dysenteric amoeba of man described and figured by Dobell (C.C.), 1919, *The Amoebae living in Man :* 31-70, Pl. I, figs. 1-6 ; pl. II, fig. 16 ; Pl. III ; Pl. IV, figs. 70-76 ;

(c) to direct that the specific name *Amoeba coli*, as published by Grassi in 1879, is to be treated as being a specific name then published for the first time and to validate the trivial name so published ;

(d) to direct that the trivial name *coli* Grassi, 1879 (as published in the binominal combination *Amoeba coli*), as validated in (c) above, is to be applied to the large nondysenteric amoeba of man described and figured by Dobell (C.C.), 1919, *loc. cit.* : 78-92, Pl. I, figs. 12-15 ; Pl. II, fig. 17 ; Pl. IV, fig. 55-69 ;

(e) to designate *Amoeba coli* Grassi, 1879, as validated under (c) above and as defined in (d) above, as the type species of the genus *Entamoeba* Casagrandi and Barbagallo, 1895 (a genus based upon a misidentified type species) ;

(f) to direct that *Amoeba coli* Grassi, 1879, validated and defined as in (e) above, is to be accepted as the type species by original designation of *Löschia* Chatton and Lalung-Bonnaire, 1912 (a genus based upon a misidentified type species) ;

(3) to declare that the name *Entamoeba* Casagrandi & Barbagallo, 1895; is not a homonym of the name *Endamoeba* Leidy, 1879 ;

(4) to place the under-mentioned generic names on the *Official List of Generic Names in Zoology* :—

(a) *Entamoeba* Casagrandi & Barbagallo, 1895 (type species by designation under the plenary powers, under (2) (e) above : *Amoeba coli* Grassi, 1879, as validated and defined under (2) (c) and (2) (d) above respectively) (gender of generic name : feminine) ;

(b) *Poneramoeba* Lühe, 1909 (type species, by original designation : *Entamoeba histolytica* Schaudinn, 1903) (gender of generic name : feminine) (for use by workers who consider *Entamoeba histolytica* Schaudinn, 1903, to be generically distinct from *Amoeba coli* Grassi, the type species of *Entamoeba* Casagrandi & Barbagallo, 1895) ;

(5) to confirm the position on the *Official List of Generic Names in Zoology of Endamoeba* Leidy, 1879 (type species, by monotypy : *Amoeba blattae* Bütschli, 1878) (gender of generic name : feminine) ;

(6) to place the generic name *Löschia* Chatton & Lalung-Bonnaire, 1912 (type species, by designation under the plenary powers under (2) (f) above: *Amoeba coli* Grassi, 1879 (an objective synonym of *Entamoeba* Casagrandi & Barbagallo, 1895)) on the *Official Index of Rejected and Invalid Generic Names in Zoology* ;

(7) to place the under-mentioned specific trivial names on the *Official List of Specific Trivial Names in Zoology* ;

(a) *blattae* Bütschli, 1878 (as published in the binominal combination *Amoeba blattae*) (type species of *Endamoeba* Leidy, 1879) ;

(b) *coli* Grassi, 1879 (as published in the binominal combination *Amoeba coli*) (as validated and defined under the plenary powers under (2) (c) and (2) (d) above respectively) (type species of *Entamoeba* Casagrandi & Barbagallo, 1895);

(c) *histolytica* Schaudinn, 1903 (as published in the binominal combination *Entamoeba histolytica*) (as defined under the plenary powers under (2) (b) above) (type species of *Poneramoeba* Lühe, 1909);

(8) to place the under-mentioned trivial names on the *Official Index of Rejected and Invalid Specific Trivial Names in Zoology*:

(a) *coli* Lösch, 1875 (as published in the binominal combination *Amoeba coli*), as suppressed under the plenary powers under (2) (a) (i) above);

(b) the under-mentioned trivial names suppressed under the plenary powers under (2) (a) (ii) above:

(α) *urogenitalis* Baelz, 1883 (as published in the binominal combination *Amoeba urogenitalis*);

(β) *vaginalis* Blanchard, 1885 (as published in the binominal combination *Amoeba vaginalis*);

(γ) *intestinalis* Blanchard, 1885 (as published in the binominal combination *Amoeba intestinalis*);

(δ) *dysenterica* Pfeiffer, 1888 (as published in the binominal combination *Amoeba dysenterica*);

(ε) *dysenteriae* Councilman & Lafleur, 1891 (as published in the binominal combination *Amoeba dysenteriae*).

9. Before signing the present Report, I submitted it in draft for comment to Professor Harold Kirby and Dr. Ellsworth C. Dougherty, the two specialists who had communicated with the Commission on this subject. Both have since informed me that they concur in the solution suggested.

ON THE QUESTION OF THE CORRECT NAME FOR THE TYPE SPECIES OF THE GENUS "STEPHANURUS" DIESING, 1839 (CLASS NEMATODA*, ORDER RHABDITIDA), WITH RECOMMENDATIONS FOR THE PLACING OF CERTAIN NAMES ON THE "OFFICIAL LISTS"

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(Commission's reference Z.N.(S.)188)

Introduction

1. The type species, which is also the only generally recognized species, of *Stephanurus* Diesing, 1839—a strongyline genus placed by Chitwood and Chitwood (1937) in a subfamily STEPHANURINAE Railliet, Henry, and Bauche, 1919, of the family SYNGAMIDAE Leiper, 1912—is generally known as *Stephanurus dentatus* Diesing, 1839. It is the kidney worm of swine (*Sus scrofa*) and an organism of cosmopolitan distribution and considerable economic importance. Because of its prominence as a parasite of a domestic animal and the resulting close scrutiny it must suffer, it is rather surprising that in recent years the question of its specific name has not received more attention. It is now possible to say that certain facts in its history make apparent that the specific trivial name of Diesing (1839) can be used only if the International Commission on Zoological Nomenclature invokes its plenary powers. A detailed history of earlier papers was given by Tayler (1900); and the essential points in the nomenclatorial history have been more recently reviewed in a paper originating from the Imperial Bureau of Agricultural Parasitology, England, and apparently written by B. G. Peters (i.e., B.G.P., 1931), but therein the nomenclatorial issues were not directly faced.

2. An earlier draft of the present paper was first submitted to the International Commission in 1945. In its original form it dealt with problems, certain of which have subsequently been clarified by action of the International Commission and of the International Congress of Zoology at the historic Paris meetings in July, 1948. The following month (in August, 1948) the author visited Mr. Francis Hemming, Secretary to the International Commission; and it was at that time agreed between them that, if pertinent matters were still to be raised, the paper should be rewritten in light of decisions taken at the Paris Meetings and resubmitted. I have delayed doing this until the "Official Record of Proceedings of the International Commission on Zoological Nomenclature at their Session held in Paris in July, 1948" could be published. Now that such has been done in Volume 4 of *The Bulletin of Zoological Nomenclature*, I have reviewed the earlier draft and rewritten it. It is hereby resubmitted.

3. In the original draft a major problem, now essentially solved, dealt with questions of secondary homonymy (see 1950, *Bull. zool. Nomencl.* **4**:

* The classification preferred by the author is to consider Nematoda a Phylum divided into Classes Phasmidea (including the Order Rhabditida) and Aphasmidea.

118–125, for conclusions of the International Commission, as approved by the Congress, on the subject of homonyms in zoological nomenclature). It is my feeling, however, that despite this considerable clarification it is desirable that the Commission consider a case of secondary homonymy and render an *Opinion* applying the new regulations ; in this way, as is pointed out later herein, one minor problem may be definitely solved. To ensure this end, I am reviewing in section II the main historical points and presenting in section III an analysis of the nomenclatorial problem.

4. A major consideration in regard to the name to be used for the kidney worm of swine still remains—namely, the question of a decision on the part of the Commission as to whether it might be better in the interests of stability to secure the use of the trivial name *dentatus* of Diesing, 1839, by exercise of plenary powers. Suggestions on this point are put forth in section IV.

5. Finally it is recommended in section V that certain generic names considered herein (particularly *Stephanurus* Diesing, 1839) be placed on the " Official List of Generic Names in Zoology " and certain trivial names on the " Official List of Specific Trivial Names in Zoology."

II. Review of the Nomenclatorial History

6. The kidney worm of swine was first described by Diesing (1839) as *Stephanurus dentatus*, only species of a new genus *Stephanurus*. The modernness of Diesing's conception is apparent from the fact that today it is still generally known by that name. Indeed, if Diesing's nomenclatorial treatment had been host another strongyline species (Order Rhabditida) with the same trivial name *dentatus*. Confusion arises, however, because there exists from the same host another strongyline species (Order Rhabditida) with the same trivial name, namely, one of the nodular worms of swine, now known as *Oesophagostomum dentatum* (Rudolphi, 1803) Molin, 1861 (originally *Strongylus dentatus* Rudolphi, 1803). Because of the fact that all strongylines with relatively well-developed bursae in the male were grouped by many nineteenth century helminthologists into one or two genera, i.e., *Strongylus* Müller, 1780, and *Sclerostoma* Rudolphi, 1809, it would not be surprising if at one time or another both *Stephanurus dentatus* and *Oesophagostomum dentatum* were to be included under a single genus. This has actually occurred as is shown in the following historical summary.

7. The important facts in the nomenclatorial history of the kidney worm are as follows :—

(i) Diesing (1839 : 232-233), as already noted, described the kidney worm of swine as *Stephanurus dentatus*, only species of a new genus *Stephanurus*.

(ii) Leidy (1856 : 54) referred to nematodes, apparently one of the nodular worms of swine, briefly : "*Sclerostoma dentatum*, Rud. Several specimens, male and female, were obtained from the liver of the hog, *Sus scrofa*."

(iii) White (1859 : 428), described specimens of the kidney worm as *Stephanurus dentatus*, but apparently confused these with the worms reported by Leidy, as implied by the title of his paper : " Exhibition of specimens and figures of *Stephanurus dentatus*, Diesing, *Sclerostoma dentatum* ? Rudolphi " ; he thus implied that the kidney worm might be the same as *Strongylus dentatus* Rudolphi, 1803 (now known as *Oesophagostomum dentatum*).

(iv) Verrill (1870a : 248–249 ; 1870b : 137–138 ; 1870c) described the kidney worm under the name *Sclerostoma pinguicola* ; he was ignorant of Diesing's description.

(v) Dean (1874 : 62–63) described very well the gross pathology produced by *Strongylus* [=*Stephanurus*] *dentatus* without indicating whether it was Rudolphi's or Diesing's name he had in mind.

(vi) Cobbold (1879 : 412) recommended the new name *Stephanurus nattereri* as a possible substitute for *Stephanurus dentatus* in order to avoid confusion with *Sclerostoma* [=*Oesophagostomum*] *dentatum*.

(vii) De Magalhães (1894) published a study of the morphology of the kidney worm. He concluded that it belonged in the genus *Strongylus* and accepted for it the name " *Strongylus* (*Sclerostomum*) *pinguicola* (Verrill)."

(viii) Railliet (1896 : 160) synonymized *Stephanurus* with *Sclerostoma* and accepted *Sclerostoma pinguicola* of Verrill (1870).

(ix) Tayler (1900 : 626) also regarded *Stephanurus* Diesing, 1839, as a synonym of *Sclerostoma* Rudolphi, 1809. She accordingly accepted *Sclerostoma pinguicola* Verrill, 1870, as the correct name of the kidney worm and placed *Stephanurus dentatus*, *Stephanurus nattereri*, and *Strongylus dentatus* of Dean (1874) as synonyms thereof ; she regarded *Sclerostoma dentatum* of Leidy (1856) as what is now *Oesophagostomum dentatum*.

(x) Neither de Magalhães, Railliet, nor Tayler specifically formed a combination between Diesing's trivial name *dentatus* and the generic names to which they in effect transferred it ; however, all three rejected it as a homonym.

(xi) Drabble (1922, 1923) described the kidney worm under the new name *Sclerostomum renium*, claiming that it was distinct from " *Sclerostoma pinguicola* (syn. *Stephanurus dentatus*)." However, Cameron and Clunies Ross (1924) have shown conclusively that Drabble's species is the same as Diesing's.

(xii) De Almeida (1928) described as *Stephanurus morai* specimens that Peters (1931) has shown also to belong to Diesing's species.

(xiii) Peters (1931) and others, both previously and subsequently, reverted to the trivial name *dentatus* with their recognition of genus *Stephanurus* as independent.

III. Discussion of the Nomenclatorial Problems

8. It is apparent from the foregoing historical summary that :—

(i) There are two species of nematodes parasitic in swine bearing the same trivial name, *dentatus*, but originally described in separate genera ;

(ii) Apparent confusion existed between these two species or at least between their names in the works of certain early writers (White, Dean), but these writers did not specifically regard or reject the later trivial name, *dentatus* of Diesing, 1839, as a homonym of earlier trivial name, *dentatus* of Rudolphi, 1803.

(iii) Later workers (de Magalhães, Railliet, Tayler) recognized both species and regarded them as congeneric, uniting them either in the genus *Strongylus* Müller, 1780, or in the genus *Sclerostoma* Rudolphi, 1809 ; they rejected the later name, *dentatus* of Diesing, 1839, as a homonym of the earlier, *dentatus* of Rudolphi, 1803, without, however, specifically forming a combination between the later trivial name and the new generic names to which it was transferred.

9. The International Congress at the Paris Meeting officially recognized for the first time two categories of homonymy—primary and secondary. Inasmuch as the two nematodes parastic in swine were originally described in separate genera, their trivial names cannot, in accordance with the definition of primary homonymy provided by the International Congress, be regarded as primary homonyms.

10. Under the definition of secondary homonymy drawn up by the International Commission at its Paris Meetings and subsequently approved by the Congress, a secondary homonym is to be regarded as having been rejected and hence permanently suppressed only if specifically recognised and rejected as such. This was not the case with either White (1859) or Dean (1874). White in effect implied, probably inadvertently, that the kidney worm of swine and that species of nodular worm occurring in the same host and originally given the trivial name *dentatus* by Rudolphi (1803) were conspecific. This synonymy was subsequently (and is at present) recognized to be untrue. Dean, in designating the kidney worm *Strongylus dentatus*, created a condition of secondary homonymy, but did not recognise and reject the trivial name *dentatus* of Diesing, 1839.

11. The position is quite otherwise in the case of de Magalhães (1894), Railliet (1896) and Tayler (1900), for each of these authors is to be regarded as having definitely recognized, in their estimation, *dentatus* of Diesing, 1839, to be a secondary homonym of *dentatus* of Rudolphi, 1803, and as having accordingly rejected the former. It was decided by the Congress at Paris, on the recommendation of the Commission, that, wherever a trivial name is clearly rejected as a secondary homonym prior to midnight G.M.T., December 31st, 1950/January 1st, 1951, such rejection is to be accepted as valid, and the

trivial name in question is to be permanently suppressed. It is seemingly clear, therefore, that under this rule (to be formally constituted in an Article in the forthcoming edition of the *Règles Internationales de la Nomenclature Zoologique*), the specific trivial name *dentatus* of Diesing, 1839, is no longer available for the kidney worm of swine unless it is preserved by the International Commission under its plenary powers.

12. However, it has been my experience that some zoologists have held that homonymy does not exist unless a combination of generic and trivial name has been made so that identical specific names exist for two species, of which the trivial name of one (the later) then becomes a homonym. This would seem to be, as the Secretary of the International Commission might express it, a somewhat " ritualistic " requirement and not a necessary or even reasonable interpretation of the present rulings. However, in order to obviate any doubt, it is to be hoped that the International Commission will issue a ruling on this point in the form of a *Declaration*.

IV. The Correct Name for the Kidney Worm of Swine

13. As de Magalhães (1894), Railliet (1896), and Tayler (1900) are presumably to be regarded as having rendered Diesing's *dentatus* unavailable, the next trivial name to be considered for the kidney worm of swine is the subjective synonym *pinguicola* of Verrill, 1870. There is no prior usage of this trivial name in the Nematoda, and therefore the kidney worm would become *Stephanurus pinguicola* (Verrill, 1870) comb. nov. The names *Stephanurus nattereri* Cobbold, 1879, *Sclerostoma renium* Drabble, 1923, and *Stephanurus morai* de Almeida, 1928, would fall as subjective synonyms thereof.

14. The synonymy of *S. pinguicola* would be as follows :

Stephanurus pinguicola (Verrill, 1870) comb. nov.

Synonyms :

Stephanurus dentatus Diesing, 1839 ; *Sclerostoma pinguicola* Verrill, 1870 ; *Strongylus dentatus*, of Dean, 1874 [*non Strongylus dentatus* Rudolphi, 1803] ; *Stephanurus nattereri* Cobbold, 1879 ; " *Sclerostomum pinguicola* Verrill, 1870," of de Magalhães, 1894 ; *Strongylus* (*Sclerostomum*) *pinguicola* (Verrill, 1870) de Magalhães, 1894 ; *Sclerostomum renium* Drabble, 1922 ; *Stephanurus morai* de Almeida, 1928.

15. The question now arises as to whether the foregoing change is in the best interests of nomenclatorial stability and uniformity. *Stephanurus dentatus* Diesing, 1839, is a widely used name for an important parasite. Might it not be the wiser procedure to seek to establish this name through an appeal to the International Commission's plenary powers ?

16. A solution to the foregoing problems would appear to me to be best realized by canvassing a representative group of parasitologists concerned with problems of nomenclature. As one such person, I should myself favour

permitting the regular application of the *Règles* to this case for the reasons that :

(i) The occurrence of two relatively closely related parasitic species having the same trivial name (*Stephanurus dentatus* and *Oesophagostomum dentatum*) in the same host should, if possible, be avoided.

(ii) I am not convinced that the dislocation of a change in the *trivial* name (*dentatus*) of the kidney worm of swine would be serious in view of the stability of its generic name (*Stephanurus*).

(iii) The suspension of the *Règles* in this case would, I believe, tend to weaken their stability in the long run, for the issue, without the invocation of plenary powers, is apparently clear-cut from the nomenclatorial viewpoint and would thereby serve as a good example of the application of the new rulings on secondary homonymy.

V. Recommendation for the placing of certain names on the " Official Lists "

17. At the present time the genus *Stephanurus* Diesing, 1939, has but one recognized species, originally designated *Stephanurus dentatus* by Diesing (1839). The genus has been generally recognized as independent for almost 50 years. It therefore seems desirable that its name be placed on the " Official List of Generic Names in Zoology " with type species *Stephanurus dentatus* Diesing, 1839 (subjective synonym, *Sclerostoma pinguicola*, Verrill, 1870= *Stephanurus pinguicola* (Verrill, 1870) comb. nov.). Depending upon the ultimate decision of the International Commission, either the trivial name *dentatus* of Diesing will (under plenary powers) be validated for the kidney worm of swine, or it must be rejected. In either event, the valid trivial name of the species should be included in the " Official List of Specific Trivial Names in Zoology." I therefore recommend that on the basis of the action of the International Commission either the trivial name *dentatus* Diesing, 1839 (as published in the binominal combination *Stephanurus dentatus*) or the trivial name *pinguicola* Verrill, 1870 (as published in the binominal combination *Sclerostoma pinguicola*) be so placed. If *dentatus* of Diesing, 1839, is not preserved under plenary powers, it must be placed on the " Official Index of Rejected and Invalid Specific Trivial Names in Zoology."

18. Finally, in order that the decision to be taken in the present case may be as complete as possible, I recommend that, when stabilizing the name of the kidney worm of swine, the International Commission should also stabilize the name of the common nodular worm of swine discussed in the present paper. The earliest name for this form, as now accepted generally, is *Strongylus dentatus* Rudolphi, 1803. Careful check in Stiles and Hassall's *Index-Catalogue of Medical and Veterinary Zoology. Subjects : Roundworms* . . . (1920, U.S. Hyg. Lab. Bull. **114**) reveals no problem of homonymy as regards this name. However, there are now known four species of nodular worms in domestic swine, and in all probability it cannot be stated with absolute certainty to which of these Rudolphi's name applied. It seems, nevertheless, almost

almost certain that the commonest of these, to which the trivial name *dentatum* (in the binominal combination *Oesophagostomum dentatum*) is now universally applied, was one of the species, probably the only one, studied by him. Accordingly, I propose that the International Commission place on the " Official List of Specific Trivial Names in Zoology," along with the name recognized by them as valid for the kidney worm of swine, whichever that may be, the trivial name *dentatus* Rudolphi, 1803 (as published in the binominal combination *Strongylus dentatus*), an indication being made by the International Commission at the same time that this trivial name is to be identified by reference to the definitive description and figures published for this species by Goodey (1924, pp. 1–14, figs. 1–15).

19. As already explained, this species is currently referred by specialists to the genus *Oesophagostomum* Molin, 1861, of which it is regarded as type by reason of its selection by Stiles and Hassall (1905, : 124).*

I therefore also ask that the generic name, *Oesophagostomum* Molin, 1861 (type species, by subsequent selection (Stiles and Hassall, 1905) : *Strongylus dentatus* Rudolphi, 1803, defined as already indicated) be placed on the " Official List of Generic Names in Zoology."

VI. Summary

20. A survey of the nomenclatorial history and status of the species generally known as *Stephanurus dentatus* Diesing, 1839, the kidney-worm of swine, has been presented. Evidence has been given that, under the recent rulings given by the Congress on the advice of the International Commission at the Paris Meetings, *dentatus* of Diesing, 1839, must be considered as an invalid secondary homonym of the trivial name *dentatus* of Rudolphi, 1803, by reason of the rejection of the former by Railliet and others when the two species so named were placed by them in a single genus (*Strongylus* Müller, 1780, or *Sclerostoma* Rudolphi, 1809).

21. The fact that in no case did the authors specifically rejecting the trivial name *dentatus* of Diesing, 1839, make actual combinations of this trivial name

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* Prior to the clarification of Article 30 by the XIII International Congress of Zoology at Paris in July, 1948, it would have been a matter of doubt whether the action by Stiles and Hassall constituted a valid selection of the above species as type of *Oesophagostomum* (a) because Molin (1861) included *Strongylus dentatus* Rudolphi, 1803, in this genus only by (i) referring (p. 443) to it once in the discussion of the genus as *Oesophagostomum dentatum*, but (ii) later in the discussion of individual species merely citing (p. 445) the name *Strongylus dentatus* as a synonym of a newly named nominal species (*Oesophagostomum subulatum* Molin, 1861) and because (b) Stiles and Hassall, when making their selection for the genus *Oesophagostomum*, cited the type as follows : " *O. subulatum*=*O. dentatum* (Rudolphi)." Inasmuch as *O. subulatum* was recorded by Stiles and Hassall as the more recent of the two names, one is, I feel, entitled to interpret their action as selecting *O. dentatum* (=*Strongylus dentatus*) as type, of which *O. subulatum* was a synonym. Under the decision of the XIII International Congress of Zoology already referred to, it may be seen that *Strongylus dentatus* Rudolphi, 1803, is to be regarded as an originally included species of the genus *Oesophagostomum* Molin, 1861, and that the method used by Stiles and Hassall in selecting the type species of this genus constitutes a valid selection of Rudolphi's species (see 1950, *Bull. zool. Nomencl.*, **4** : 179–180—points (3) (a) and (3) (b)).

with the generic names mentioned in paragraph 20 and thus did not actually create the homonymous combinations raises a point not explicitly covered in the emended rulings formulated by the International Commission at the Paris Meetings to cover secondary homonymy. Some zoologists have held that an actual citation of a homonymous specific name is necessary before the trivial name involved can be rejected as a homonym. The International Commission is hereby requested to render a *Declaration* on this point.

22. It is hoped that before the International Commission reach a decision, it will have before it the views of representative parasitologists on the question whether the trivial name *dentatus* of Diesing, 1839, should be preserved by invocation of the Commission's plenary powers. Arguments are presented in opposition to suspension of the rules in this case.

23. It is recommended to the International Commission that the name *Stephanurus* Diesing, 1839 (type species, by monotypy : *Stephanurus dentatus* Diesing, 1839 [subjective synonym, *Sclerostoma pinguicola* Verrill, 1870 (=*Stephanurus pinguicola* (Verrill, 1870) comb. nov.)] be placed on the " Official List of Generic Names in Zoology." At the same time, the valid trivial name of the kidney worm of swine should be placed on the " Official List of Specific Trivial Names in Zoology." This will be either *dentatus* Diesing, 1839 (as published in the binominal combination *Stephanurus dentatus*), if preserved by the International Commission through their plenary powers, or, if not, *pinguicola* Verrill, 1870 (as published in the binominal combination *Sclerostoma pinguicola*). I hereby recommend the latter procedure.

24. The trivial name *dentatus* of Rudolphi, 1803, is the generally accepted name for the most common of the four nodular worms of swine. This nominal species is also type of the genus *Oesophagostomum* Molin, 1861. In order to complete the present case, it is recommended to the International Commission that the name *Oesophagostomum* Molin, 1861 (type species, by subsequent selection (Stiles and Hassall, 1905) : *Strongylus dentatus* Rudolphi, 1803) also be placed on the " Official List of Generic Names in Zoology " and that at the same time the trivial name *dentatus* Rudolphi, 1803 (as published in the binominal combination *Strongylus dentatus*) be placed on the " Official List of Specific Trivial Names in Zoology " and identified with the definitive description and figures of Goodey (1924, pp. 1–14, figs. 1–15).

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ON THE QUESTION OF THE DESIRABILITY OF RETAINING THE TRIVIAL NAME "DENTATUS" DIESING, 1839 (AS PUBLISHED IN THE BINOMINAL COMBINATION "STEPHANURUS DENTATUS") AS THE TRIVIAL NAME OF THE KIDNEY WORM OF SWINE (CLASS NEMATODA, ORDER RHABDITIDA): AN APPEAL TO PARASITOLOGISTS FOR VIEWS ON THE QUESTION RAISED BY DR. ELLSWORTH C. DOUGHERTY

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(Commission's reference Z.N.(S.)188)

1. In his application to the International Commission on Zoological Nomenclature on the subject of the trivial name properly applicable to the kidney worm of swine (the type species of the genus *Stephanurus* Diesing), Dr.Ellsworth C. Dougherty discusses two separate questions: first, the question whether the trivial name *dentatus* Diesing, 1839 (as published in the binominal combination *Stephanurus dentatus*), the first trivial name published for that species, should be regarded as an invalid name on the ground that it is a junior secondary homonym of the trivial name *dentatus* Rudolphi, 1803 (as published in the binominal combination *Strongylus dentatus*), the two species having at different times been placed by different authors in the same genus; second, the question whether, if *dentatus* Diesing, 1839, is, under the *Règles*, a name which must be rejected as a secondary homonym of *dentatus* Rudolphi, 1803, it is desirable that the International Commission on Zoological Nomenclature should use its plenary powers for the purpose of validating the name *dentatus* Diesing, 1839, as the name of the kidney worm of swine.

2. On the first of these questions, Dr. Dougherty points out that Magalhães (1894), Railliet (1896) and Taylor (1900) each " definitely recognized, in their estimation, *dentatus* of Diesing, 1839, to be a secondary homoynym of *dentatus* of Rudolphi, 1803 " and " accordingly rejected the former ". Dr. Dougherty then refers to the decisions on the question of the rules governing specific homonymy taken by the Thirteenth International Congress of Zoology in Paris in 1948 and reaches the conclusion that, under the rules so revised, the trivial name *dentatus* Diesing, 1839, must be regarded as having been rendered permanently invalid by reason of the action taken by the authors cited above ; at the same time however, Dr. Dougherty recalls that in the past it has been argued that, in order to establish that a state of secondary homonymy exists, it is necessary not only for an author definitely to reject as a secondary homonym, the later published of any pair of homonyms but also to cite both species under the same combination of generic name and specific trivial name. In this connection, it is useful to recall that considerable discussion took place at the Sixth (Public) Meeting of the International Commission at its Paris Session regarding the criteria to be adopted in determining whether a given pair of names were to be regarded as secondary homonyms of one another ; the object of this dicussion was to devise criteria which would be clear and unambiguous, depending upon objective data and would at the same time be suitable for application not only to cases arising after the introduction of the new system but also to cases which had arisen prior to that date and to which the new system would need to be applied retrospectively. This discussion is recorded in considerable detail in the *Official Record of Proceedings* under heading (F) on pp. 112–115 of volume 4 of the *Bulletin of Zoological Nomenclature*. The formal record of the recommendation on this subject submitted by the Commission to, and later approved by, the Congress will be found embodied in points (8) and (9) of the Conclusion reached (see page 121 of the volume referred to above). At no time during these discussions was it suggested that the new provision to be adopted should require that, before two names could be regarded as being secondary homonyms of one another, each must be cited simultaneously by the same author under the same specific name (combination of generic name and specific trivial name), although (as stated by Dr. Dougherty) this argument had sometimes been advanced in the past by authors seeking to interpret the ambiguous provisions of the then-existing Article 35 (usually in relation to particular cases where the authors concerned were anxious to find reasons justifying the retention of a name which had been rejected by a former author as a secondary homonym but which was no longer considered non-generic with the other species bearing the same trivial name). Not only was no such argument advanced but, on the contrary, the view was strongly expressed that great care must be taken in the revision of Article 35 to avoid the inclusion of formal provisions of a " ritualistic " character of the kind which (as had previously been rightly pointed out by Dr. J. Brookes Knight (Smithsonian Institution, Washington, D.C.) had marred the amendment to Article 25 made by the Tenth International Congress of Zoology at Budapest in 1926). For this reason therefore it was expressly agreed that no definition of the procedure to be adopted by an author in rejecting one name as a secondary homonym of another should be inserted in the new rule and that, as regards rejections effected prior to 1st January 1951, the test to be applied should be simply

whether or not the later author rejected the one name as a secondary homonym of the other. The " rejections " discussed by Dr. Dougherty in relation to the name *dentatus* Diesing, 1839, were all effected long before the Paris Congress and fall therefore to be judged by the above simple test. The evidence brought forward by Dr. Dougherty in regard to the action taken by de Magalhães, Railliet and Taylor in the last decade of the XIXth century clearly shows that those authors duly " rejected " the name *dentatus* Diesing, 1839, within the meaning of that term as used in Point (8) of the decision of the Paris Congress on this subject.

3. *Appeal to parasitologists :* The position which has now to be considered is therefore (as Dr. Dougherty points out) (1) whether or not confusion would result from the dropping (as an invalid homonym) of the name *dentatus* Diesing, 1839, as the trivial name of the Kidney Worm of Swine, that name being replaced by the name *pinguicola* Verrill, 1870, and (2) if the answer to the foregoing question is in the affirmative, whether the International Commission should prevent that confusion from arising by using its plenary powers to validate the name *dentatus* Diesing, 1839 for the Kidney Worm, that course being possible because the nodular worm to which the same trivial name had been given by Rudolphi in 1803 (in the combination *Strongylus dentatus*) is not considered congeneric with the Kidney Worm and in consequence, according to current taxonomic ideas, there would be no question of homonymy if the name *dentatus* Diesing were to be used for the Kidney Worm in the genus *Stephanurus* Diesing.

4. The foregoing is a matter on which the International Commission must naturally rely upon the views of parasitologists concerned with this group, who alone can advise on the relative merits of the question at issue (namely whether it is desirable that the name *dentatus* Diesing, 1839, or the name *pinguicola* Verrill, 1870, should be the valid name for the Kidney Worm of Swine).

5. Accordingly, it is particularly hoped that any parasitologist interested in this subject will be good enough to forward as soon as possible, to the Secretary to the Commission (address : 28 Park Village East, Regent's Park, London, N.W.1, England) a statement setting out his views for the consideration of the International Commission.

PROPOSED USE OF THE PLENARY POWERS TO VARY THE TYPE SPECIES OF THE GENUS "EYSARCORIS" HAHN, 1834 (CLASS INSECTA, ORDER HEMIPTERA), IN ORDER TO VALIDATE EXISTING NOMENCLATORIAL PRACTICE

By W. E. CHINA, Sc.D.

(*Deputy Keeper, Department of Entomology, British Museum (Natural History), London*)

(Commission's reference Z.N.(S.)212)

The object of the present application is to seek the help of the International Commission on Zoological Nomenclature in preventing the confusion which would inevitably arise if the *Règles* were strictly applied in the case of the generic name *Eysarcoris* Hahn, 1834 (Class Insecta, Order Hemiptera).

The relevant facts are as follows: The generic name *Eysarcoris* Hahn, 1834 (*Wanzehart. Ins.* **2**: 66) was established without a designated or indicated type species; one of the species included in it by Hahn was *Cimex punctatus* Linnaeus, 1758 (*Syst. Nat.* (ed. 10) **1**: 444). This species was selected as the type species by Desmarest in 1845 (*in* Orbigny, *Dict. univ. Hist. nat.* (Disciples, ed.) **5**: 526). This selection, being the first to have been made, is valid under the *Règles*. It has not, however, been accepted by hemipterists who have followed Distant, who in 1902 (*Faun. Brit Ind Rhyn.* **1**: 165) selected *Cimex perlatus* Fabricius, 1794 (*Ent. syst.* **4**: 125) (i.e., *Cimex aeneus* Scopoli, 1763 *Ent. carn.*: 122) as the type species of this genus.

The acceptance of Desmarest's selection of *Cimex punctatus* Linnaeus as the type species of the genus *Eysarcoris* Hahn would cause much more confusion than uniformity in the generic names in the family PENTATOMIDAE, for it would involve not only the loss of the well-known generic name *Rhacognathus* Fieber, [1860] (*Europ. Hem.*: 81, 347) (which would be replaced by the name *Eysarcoris* Hahn), but also the transfer of the long-established generic name *Eysarcoris* Hahn from the sub-family PENTATOMINAE to the sub-family ASOPINAE, and the replacement in the PENTATOMINAE of name *Eysarcoris* Hahn by the little-used generic name *Stollia* Ellenrieder, 1862 (*Nat. Tijdschr. ned. Ind.* **24**: 149). This latter genus has, as its type species by monotypy, an Oriental species *Stollia fuliginosa* Ellenrieder, 1862, which is only doubtfully congeneric with the European species now (incorrectly) referred to the genus *Eysarcoris* Hahn.

In order to avoid the confusion and uncertainties described above, I ask the International Commission on Zoological Nomenclature:—

(1) to use its plenary powers:—

(a) to set aside all selections of type species for the genus *Eysarcoris* Hahn, 1834, made prior to the proposed decision;

(b) to designate *Cimex aeneus* Scopoli, 1763, to be the type species of the foregoing genus;

(2) to place the generic name *Eysarcoris* Hahn, 1834 (type species, by designation under the plenary powers, as proposed in (1) (b) above: *Cimex aeneus* Scopoli, 1763) on the *Official List of Generic Names in Zoology* (gender of generic name: masculine);

(3) to place the trivial name *aeneus* Scopoli, 1763 (as published in the binominal combination *Cimex aeneus*) on the *Official List of Specific Trivial Names in Zoology*.

PROPOSED USE OF THE PLENARY POWERS TO VALIDATE THE SPECIFIC TRIVIAL NAME " ACUMINATA " IOFF & TIFLOV, 1946 (AS PUBLISHED IN THE COMBINATION " RHADINOPSYLLA (RECTOFRONTIA) ACUMINATA") AS APPLIED TO THE SPECIES NUMBERED " 68 " BY THOSE AUTHORS (CLASS INSECTA, ORDER SIPHONAPTERA)

By G. H. E. HOPKINS, O.B.E., M.A.,
(*British Museum (Natural History), Zoological Museum, Tring, Herts.*)

(Commission's reference Z.N.(S.)386)

Ioff (*in* Ioff, Tiflov, *et al.*, 1946, *Med. Parasitol. Moscow*, **15** (No. 4) : 91) published a subgenus *Ralipsylla* of *Rhadinopsylla*. On the following page he and other authors published numerous new species or subspecies which are numbered, numbers 60, 61 and 63 being referred to the subgenus *Ralipsylla* and 64 to 68 inclusive to the subgenus *Rectofrontia*. But both No. 62 and No. 66 are called " *Rhadinopsylla* (*Rectofrontia*) *acuminata* Ioff et Tiflov," and this is the first time this name had been published. Obviously one of these duplicate names must be a *lapsus calami*, and it is clear from the context which is the error, because No. 62 is sandwiched in among forms of *Ralipsylla* whereas No. 66 is correctly placed among forms of *Rectofrontia* ; it is, therefore No. 66 to which the name *acuminata* was intended to apply. Moreover, in the separates of the paper (but not in the original publication) the name of No. 62 is altered in manuscript, presumably by Professor Ioff, to *Rhadinopsylla* (*Ralipsylla*) *li transbaikalica* Ioff et Tiflov. This manuscript alteration does not, of course, constitute publication, but in No. 6 of the same periodical and volume, also published in 1946, there is (: 94) a list of corrections of misprints in the original paper, among which is the statement that the name of species No. 62 on p. 92 of the original paper should be *Rhadinopsylla* (*Ralipsylla*) *li transbaikalica* Ioff et Tiflov, not *Rhadinopsylla* (*Rectofrontia*) *acuminata* Ioff et Tiflov as printed.

In these circumstances the strict application of the *Règles* to the present case would serve no useful purpose whatever : (1) it would involve the pedantic acceptance of something which was undoubtedly an error (namely, the application of the name *Rhadinopsylla* (*Rectofrontia*) *acuminata* Ioff and Tiflov, 1946, to the species to which those authors applied the number " 62 ") and the equally pedantic rejection, as a homonym, of the same name as deliberately applied by those authors to the entirely different species referred to by them as species number " 68 " ; (2) such action would lead to confusion in the nomenclature of these fleas, since the Russian workers would certainly not follow the strict application of the *Règles* in this matter. The present is therefore, in my opinion, pre-eminently a case where it would be appropriate for the International Commission on Zoological Nomenclature to use its plenary powers to give valid force to the evident intention of Ioff and Tiflov, when they wrote their paper in 1946, and to the consequent current practice of specialists in this group, for such action would promote uniformity and prevent

the confusion which would otherwise occur in the nomenclature of this group. The proposal which I therefore now place before the Commission is that it should :—

(1) use its plenary powers :—

(a) to suppress for the purposes both of the Law of Priority and of the Law of Homonymy the trivial name *acuminata* Ioff and Tiflov, 1946, *Med. Parasitol. Moscow* **15** (No. 4) : 91 as inadvertently published in the combination *Rhadinopsylla* (*Rectofrontia*) *acuminata*, and applied to the species there cited by those authors under the number " 62 " ;

(b) to validate the foregoing trivial name (a) as published by the foregoing authors on the same page of the same work and in the same combination and (b) as deliberately applied by those authors to the species cited by them under the number " 68 " ;

(2) place on the *Official List of Specific Trivial Names in Zoology* (i) the trivial name *acuminata* Ioff and Tiflov, 1946 (as published in the combination *Rhadinopsylla* (*Rectofrontia*) *acuminata*), as validated under (1) (b) above ; (ii) the subspecific trivial name *transbaikalica* Ioff and Tiflov, 1946, as published in the trinominal combination *Rhadinopsylla* (*Ralipsylla*) *li transbaikalica* (1946, *Med. Parisitol. Moscow*, **15** (No. 6) : 94) as a substitute name for *Rhadinopsylla* (*Rectofrontia*) *acuminata* applied in error to species No. 62 in *loc. cit.* (No. 4) : 91, suppressed under 1 (a) above.

(3) place on the *Official Index of Rejected and Invalid Specific Trivial Names in Zoology* the trivial name *acuminata* Ioff and Tiflov, 1946 (as inadvertently published in the combination *Rhadinopsylla* (*Rectofrontia*) *acuminata*) as suppressed under (1) (a) above.

APPLICATION FOR THE ADDITION OF THE NAME "SPIRULA" LAMARCK, 1799 (CLASS CEPHALOPODA) TO THE "OFFICIAL LIST OF GENERIC NAMES IN ZOOLOGY" AND MATTERS INCIDENTAL THERETO

By the late R. WINCKWORTH (*London*)

(Commission's reference Z.N.(S.) 416)

Application is hereby made for the International Commission on Zoological Nomenclature to place the name *Spirula* Lamarck, 1799 (*Mém. Soc. Hist. nat. Paris* **1799** : 80) (gender of name : feminine) on the *Official List of Generic Names in Zoology*. The only species then placed in this genus by Lamarck was *Nautilus spirula* Linnaeus, 1758 (*Syst. Nat.* (ed. 10) **1** : 710), which is therefore the type species by monotypy.

Apart from the use of the spelling *Spirulea* by Peron and Lesueur in 1807 (*Voy. Aust.*, Atlas **1** : pl. xxx) and by Oken in 1815 (*Lehrbuch Naturgesch.* **3**(1) : 333) and the emendation of that spelling to *Spirulaea* by Agassiz (L.) in 1845 (*Nomencl. zool.* (Moll.)), and the use for this genus of the name *Lituus* Cuvier, 1817 (*Règn. anim.* **2** : 369), by Gray in 1849 in a catalogue, the entire literature since the time of Lamarck refers to this genus under the name *Spirula*. The variants *Spirulea* and *Spirulaea* should be placed on the *Official Index of Rejected and Invalid Generic Names* at the same time that the name *Spirula* Lamarck is placed on the *Official List*.

The trivial name *spirula* Linnaeus, 1758 (as published in the binominal combination *Nautilus spirula*) is the oldest available name for the type species of *Spirula* Lamarck and should be placed on the *Official List of Specific Trivial Names* at the same time that the name *Spirula* Lamarck is placed on the *Official List of Generic Names*. In 1801 (*Syst. Anim. sans Vertèbr.* : 102) Lamarck renamed this species *Spirula fragilis* ; the invalid trivial name *fragilis* Lamarck, 1801, should be placed on the *Official Index of Rejected and Invalid Specific Trivial Names in Zoology*.

APPLICATION FOR A RULING THAT THE "PRODROMO" OF S. A. RENIER AND THE "PROSPETTO DELLA CLASSE DEI VERMI" (DATED 1804) PREPARED FOR INCLUSION IN THE "PRODROMO" WERE NOT PUBLISHED WITHIN THE MEANING OF ARTICLE 25 OF THE "RÈGLES"

By L. R. COX, Sc.D., F.R.S.

(*Department of Geology, British Museum (Natural History), London*)

(Commission's reference Z.N.(S.) 432)

1. The object of the present application is to secure from the International Commission on Zoological Nomenclature a ruling that the "Prodromo" of S. A. Renier and the "Prospetto della Classe dei Vermi" (dated 1804) prepared by that author for inclusion in the "Prodromo" were never published within the meaning of Article 25 (as clarified by the International Congress of Zoology in 1948—see 1950, *Bull. zool. Nomencl.* **4**: 215-221).

2. The immediate cause of this application is the proposition by Wenz (W.) (1940, *Handb. Paläozool., Gastropoda*: 824) of the new generic name *Nerinoides* to replace the name *Nerinella* Sharpe, 1850 (*Quart. J. geol. Soc. Lond.* **6**: 103), on the ground that that name is an invalid junior homonym of *Nerinella* Nardo, 1847 (*Prospetto Faun. marin. volg. Veneto Estuario* 13), a name assumed by Wenz to possess rights under the Law of Priority.

3. Nardo (1847) gave no diagnosis for his *Nerinella*, to which he referred a single species only, namely *Amphinome chermesina* Renier, which he described as "un piccolo annelide." If in fact Renier had ever published the foregoing specific name with an indication, definition or description, the generic name *Nerinella* Nardo, 1847, would have been an available name, for the genus so named would have been monotypical and the name would therefore have satisfied the requirements of Proviso (*a*) to Article 25—up to 1948, as defined by *Opinion* 1 and since that date, under the clarification of the foregoing Proviso adopted by the International Congress of Zoology (see 1950, *Bull. zool. Nomencl.* **4**: 78-80).

4. The name "*Amphinome chermesina* Renier" rests, however, solely upon its having been included in the work cited by Nardo as the "Prodromo 1804" of Renier, no reference of a more detailed kind being given by Nardo. Renier's *Prodromo* appears to have been a work contemplated but never published. All that can be traced of it consists of printed copies, in single folio sheets, of two of its proposed Sections. These Sections are entitled respectively "Tavola Alfabetica delle Conchiglie Adriatiche" and "Prospetto della Classe dei Vermi." Both are dated "1804." The copies traced are preserved in the Library of the University of Padua and appear to be the only original ones in existence. It is uncertain whether they are page-proofs or copies printed for circulation among students. Reduced photographic reproductions of these sheets, kindly furnished by the University Authorities for use by C. D. Sherborn, when preparing his *Index Animalium*, are in the British Museum (Natural History). The term "Amfinome chermesina" appears as a vernacular name (being rendered into Latin as *Amphinome coccinea*) on page xviii of the second of the Sections described above.

5. It is submitted that the existence of these unique fragments of a work contemplated but never published cannot be held to establish that even these fragments were ever " published " within the meaning of that expression as used in Article 25, as clarified by the Paris Congress. The difficulties which have arisen in the present case through the lack of an authoritative ruling on this subject—and the risk that similar difficulties may arise in connection with other names—can only be removed when an *Opinion* on this subject is rendered by the International Commission.

6. If, as I conclude from the evidence summarised above, there existed in 1847 no specific name *Amphinome chermesina* that had been validly published with an indication, definition or description, the name *Nerinella* Nardo, 1847, is invalid, since that name depends for availability entirely upon the indication (if any) provided by the citation of the foregoing specific name. It must be concluded therefore that, contrary to the view advanced by Wenz (1940), the name *Nerinella* Sharpe, 1850, is an available name, so far as the Law of Homonymy is concerned. It is also an available name from the point of view of the Law of Priority, it being the oldest available generic name for *Nerinea dupininana* d'Orbigny, 1843 (*Paleontolog. franc.*, Crét. **2** (Gastropod.) : 81), the type species of *Nerinella* Sharpe, by selection by Cossman, 1896 (*Ess. Paleontolog. comp.* **2** : 36). The trivial name *dupiniana* d'Orbigny, 1843, is the oldest available name for the type species of this genus.

7. The International Commission on Zoological Nomenclature is accordingly asked :—

(1) to declare, for the purpose of the removal of doubts, that neither the " Prodromo " of Renier (S.A.) nor the " Prospetto della Classe dei Vermi " intended for inclusion therein was published within the meaning of Article 25 of the *Règles* and therefore that no name acquired any status in zoological nomenclature by reason of having appeared in either of the foregoing works ;

(2) to place the generic name *Nerinella* Sharpe, 1850 (gender of name : feminine) (type species, by selection by Cossman, 1896 : *Nerinea dupiniana* d'Orbigny, 1843) on the *Official List of Generic Names in Zoology ;*

(3) to place the generic name *Nerinella* Nardo, 1847 (an invalid name because not published within the meaning of the *Règles*) on the *Official Index of Rejected and Invalid Generic Names in Zoology ;*

(4) to place the trivial name *dupiniana* d'Orbigny, 1843 (as published in the binominal combination *Nerinea dupiniana*) on the *Official List of Specific Trivial Names in Zoology ;*

(5) to place the following reputed or invalid trivial names on the *Official Index of Rejected and Invalid Specific Trivial Names in Zoology ;*

(*a*) the trivial name *chermesina* Renier (erroneously alleged to have appeared in 1804 in the binominal combination *Amphinome chermesina* in a work by Renier (S.A.), which itself was not duly published as required by the *Règles*) (a cheironym) ;

(*b*) the trivial name *coccinea* Renier (included in the combination *Amphinome coccinea* in a work dated 1804 which was not duly published as required by the *Règles*).

PROPOSED ADDITION OF " CERCOPIS " FABRICIUS, 1775, AND " SANGUINOLENTA " SCOPOLI, 1763 (AS PUBLISHED IN THE BINOMINAL COMBINATION " CICADA SANGUINOLENTA "), TO THE OFFICIAL LISTS OF GENERIC NAMES AND SPECIFIC TRIVIAL NAMES IN ZOOLOGY RESPECTIVELY

By WILHELM WAGNER (*Hamburg-Fuhlsbüttel*)

(Commission's reference Z.N.(S.)441)

The genus *Cercopis* (belonging to the Homoptera Auchenorrhyncha) was established by Fabricius, 1775 (*Syst. Ent. :* 688). The name was published in accordance with the *Règles*. It was accompanied by a diagnosis, but Fabricius did not designate a type species. However, since the name was published before 1st January, 1931, it is not invalidated by this omission. The name *Cercopis* Fabricius, 1775, is not a homonym of any previously published generic name.

Fabricius included nine species in this genus, which alone, according to Rule (g) in Article 30, are eligible for selection as the type species of the genus. Four different species have been cited as type species of this genus in the literature, and even in the most recent literature there appears to be confusion as to the validity of these type selections. A list of references is given in the Appendix to this paper of selections or reputed selections of a type species for the genus *Cercopis* Fabricius, which has been kindly furnished by Professor Z. P. Metcalf *in litt.*).

The first type selection which was strictly in accordance with the *Règles* was that by Latreille in 1810 (*Consid. gén. Crust. Arach. Ins. :* 434). *Opinions* 11 and 136 declared that type selections made in this work in the case of all genera, for which one species only was cited, were to be accepted as valid. The only species cited in the case of the genus *Cercopis* was " *sanguinolenta* Fab," i.e., *Cercopis sanguinolenta* Fabricius, 1775 (*Syst. Ent. :* 688) ; this, as the reference given by Fabricius shows, was not a new name published by Fabricius but was the same as *Cicada sanguinolenta* Scopoli, 1763 (*Faun. carn. :* 112).

Since the validity of this type selection is beyond question, it is not necessary here to examine further the more recent references. It should be noted that in the two earlier references cited in the Appendix (namely, Latreille, 1802, and Froriep, 1806) the species *C. spumaria* Fabricius was cited but only as an example of the genus, not specifically as its type species. Consequently, this species cannot be regarded as the type species by subsequent selection in accordance with Rule (g) in Article 30. The type species must therefore be accepted as being *Cicada sanguinolenta* Scopoli, 1763.

Since, however, a number of different type species have been accepted for the genus *Cercopis* in the literature, various nomenclatorial difficulties have arisen.

Cercopis spumaria Linnaeus and *Cercopis sanguinolenta* Scopoli are now regarded as belonging to different genera. Hence the nomenclature of both the genera concerned is insecure. In the case of the first (based on *C. spumaria*) it fluctuates between *Cercopis* Fabricius and *Aphrophora* Germar, 1821, and in the case of the second (based on *C. sanguinolenta*) it fluctuates between *Cercopis* Fabricius and *Triecphora* Amyot et Serville, 1843. Both genera include relatively large and prominent species, which for the most part are very widespread in the palaearctic region, and the names of which in consequence, occur frequently in textbooks and in popular literature. The first genus is represented by more than 40 species in the palaearctic region, and the second by more than 10. Stabilisation is therefore highly necessary, in view of the frequent use of these names.

The name *Cercopis* has formed the base of the family name CERCOPIDAE and the sub-family name CERCOPINAE. But *Cercopis spumaria* and *Cercopis sanguinolenta* belong to two different sub-families. Thus, so long as there is no certainty as to which is the type species of *Cercopis*, the application of the name of the sub-family must also remain uncertain. The two above-mentioned sub-families have been treated in the most recent literature as separate families. As a result, the uncertainty extends also to the use of the family name CERCOPIDAE. This is another reason why the stabilisation of the use of the name *Cercopis* is urgently necessary.

In view of the importance of the generic name *Cercopis* Fabricius, 1775, which forms the basis for the family name CERCOPIDÆ, I regard it as of great importance that the application of this name should be stabilised in accordance with the requirements of the *Règles Internationales de la Nomenclature Zoologique*. I, therefore, request the International Commission on Zoological Nomenclature :—

(1) to place on the *Official List of Generic Names in Zoology* the generic name *Cercopis* Fabricius, 1775 (*Syst. Ent.* : 688) type species, by subsequent selection by Latreille, 1810 (*Consid. gén. Crust. Arach. Ins.* : 434) : *Cicada sanguinolenta* Scopoli, 1763 (*Ent. carn.* : 112) (gender of generic name : feminine).

(2) to place on the *Official List of Specific Trivial Names in Zoology* the trivial name *sanguinolenta* Scopoli, 1763 (as published in the binominal combination *Cicada sanguinolenta*).

Appendix

Particulars of type selections and alleged type selections made for the genus Cercopis *Fabricius*, 1775

(Based upon material furnished by Professor Z. P. Metcalf.)

Date of publication containing a selection or alleged selection of a type species for Cercopis *Fabricius*, 1775. (1)	*Author who selected or who is alleged to have selected a type species for* Cercopis *Fabricius*, 1775. (2)	*Species selected or alleged to have been selected by the author, and in the work, specified in Col.* (2). (3)
1802	*LATREILLE* Histoire naturelle générale et particulière des Crustacés et des Insectes **3** : 260.	*C. spumaria* Fabricius.
1806	*FRORIEP*, L. F. C. Dumeril's. Doctors und Professors an der Medicinischen Schule zu Paris, Analytische Zoologie. Weimar, Landes Industrie-Comptoir : 267.	*C. spumaria* Fabricius.
1810	*LATREILLE* Considerations génerales sur l'ardre naturel des animaux . . . Paris, Schoell : 434.	*C. sanguinolenta* Fabricius.
1833	*CURTIS* British Entomology **10** : 461.	*C. sanguinolenta* Linnaeus.
1840	*WESTWOOD* Synopsis of the genera of British insects **2** : 116.	*C. vulnerata* Rossi.
1844	*BLANCHARD* Dictionnaire universel d'histoire naturelle . . . **3** : 296.	*C. sanguinolenta* Fabricius.
1862	*CURTIS* British Entomology : 461.	*C. sanguinolenta* Linnaeus.
1869	*STÅL* Hemiptera Fabriciana : 11.	*C. carnifex* Fabricius.
1900	*KIRKALDY* "On the nomenclature of the Rhynchota, Heteroptera and Auchenorrhynchous Homoptera." *Entomologist* **33** : 27.	*C. spumaria* Linnaeus.
1900	*KIRKALDY* "On the nomenclature of the genera of the Rhynchota." *Entomologist* **33** : 263.	*C. spumaria* Linnaeus.
1906	*KIRKALDY* "Leafhoppers and their natural enemies." *Bull. Hawaiian Sugar Pl. Assoc. Div. Ent.* **1** : 379, 380.	*C. spumaria* Linnaeus.
1906	*KIRKALDY* "Leafhoppers and their natural enemies." *Bull. Hawaiian Sugar Pl. Assoc. Div. Ent.* **1** : 379.	*C. carnifex* Fabricius.
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1912	*LALLEMAND* "Cercopidae." Gen. Ins. **143** : 58.	*C. spumaria* Fabricius.
1912	*VAN DUZÈE* "Hemipterological gleanings." *Bull. Buffalo Soc. Nat. Sci.* **10** : 507.	*C. carnifex* Fabricius.
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Printed in Great Britain by METCHIM AND SON, LTD., Westminster, London